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# Creating positive wayfinding experience

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**Creating positive wayfinding experience**

by

Yanling Wang

A thesis submitted to the graduate faculty  
in partial fulfillment of the requirements for the degree of  
**MASTER OF FINE ARTS**

Major: Graphic Design

Program of Study Committee:

Roger Baer, Major Professor

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Ames, Iowa

2005

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Graduate College  
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This is to certify that the master's thesis of  
Yanling Wang  
has met the thesis requirements of Iowa State University

Signatures have been redacted for privacy

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## ABSTRACT

The evolution of experience design can be seen as shifts of design focus: from focusing only on one or a few aspects of a product/environment to viewing the product/environment as an integrated whole, from focusing only on the product/environment itself to studying various relationships between the product/environment and the users. As an integrated part of experience design, positive wayfinding experience comes from a holistic understanding of people, physically, cognitively and emotionally. Key elements of a positive wayfinding experience include the consideration of environment, information, service, and emotion. But the role of emotions, especially that of the positive ones on wayfinding are less explored than that of the negative ones. The goal of this thesis is to advocate the importance of positive emotions and their potentials in wayfinding. A positive wayfinding experience is effective, efficient, as well as pleasurable and enjoyable. A taxonomy of wayfinding experiences based on different wayfinding needs is proposed: in emergency, meeting deadline, reaching destination, wandering and exploration, and happily get lost.

## CHAPTER 1. INTRODUCTION

Given the inherent mobility of humans, wayfinding can be viewed as one of the earliest human activities necessary for survival. But wayfinding as a discipline did not gain much development until the 20th century. The word “way-finding” was coined in 1960 by city planner Kevin Lynch in his influential book *The Image of the City* and later became “wayfinding” in the mid-1970s. Architects, urban planners, landscape architects, environmental graphic designers as well as behavioral and cognitive psychologists have been involved in the multidisciplinary study of wayfinding. Wayfinding discussed in this thesis mainly refers to human wayfinding in built environment unless further specification is mentioned. Wayfinding at seas, in the wild lands or digital environments are not included for the discussion.

About half a century after Lynch’s research about way-finding, designers have been able to solve wayfinding problems more comprehensively. It begins with a thorough study of the environment: entrances and exits, circulation paths, districts, nodes (or transition points), vertical circulations (stairs, elevators), and landmarks. These environmental features might be reinforced for wayfinding purposes in some cases. A signage system is then introduced to provide overview of the site, routes, identification, instructions and information. Problems remain even in the most considerate wayfinding solution nowadays: there is no way for users to get information anytime anywhere; there is no way for users to get information just as the way they want; it is inconvenient to update a fixed signages system; the lack of collaboration between environment designers (urban planners, landscape architects, architects, interior designers) and environmental graphic designers remains an issue; and finally, most research and practice about wayfinding design to date focus mainly on negative emotions while positive emotions and their potentials in helping people find their way are less explored.

Wayfinding design involves landscape design, urban design, architecture design, interior design, industrial design, graphic design and more recently, interaction design. The multidisciplinary nature and its tight connection to human cognition and emotion make wayfinding an integrated part of experience design. But the study of wayfinding has been isolated from the discussion of experience design, let alone the recent study of role of emotion in experience design.

Experience design is a discipline that is still “somewhat in its infancy” [95]. As a newly named and recognized discipline, experience design integrates many previous disciplines into holistic solutions. Experience design focuses on the design of a holistic user experience. Everything a user encounters, the environment, the products, the interface and many other elements such as sound, smell or taste, is crucial for creating a positive user experience.

The evolution of experience design can be seen as shifts of design focus: from focusing only on one or a few aspects of a product/environment to viewing the product/environment as an integrated whole, from focusing only on the product/environment itself to studying various relationships between the product/environment and the users. The traditional study of human factors or ergonomics emphasizes the physical relationship between a product/environment and the user, while the field of HCI (Human-Computer Interaction) focuses more on cognitive relationships between a task and its user. Usability, “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use” [21] is one of the most popular topics in the study of HCI. But the word “satisfaction” being used in the definition of usability was “limited to avoidance of physical or cognitive discomfort” [60]. Traditional cognitive approaches to product usability have tended to underestimate, fragment or neglect emotion from a holistic understanding of the user experience. It is not enough to design a product/environment that functions, that is understandable, learnable and easy to use. “We also need to build products that bring joy and excitement, pleasure and fun, and yes, beauty, to people’s lives” [81]. With the awareness that design is not merely about physical and cognitive qualities of a product or service, but a holistic user experience, a newly named discipline, experience design, emerged at the end



of the 1990s. At the same time, the role of emotion and its impact on experience design has received increasing attention from psychologists, product designers and the field of HCI.

Emotion has been a topic in philosophy for a long history while positive emotions did not gain enough attention in the field of psychology until 1980s. The study of positive emotions has increased significantly in recent years. In a 1999 paper, *A Neuropsychological Theory of Positive Affect and Its Influence on Cognition*, the authors declared:

“A large amount of research has shown convincingly that even moderate functions in positive feelings can systematically affect cognitive processing. For example, Isen and others have shown that mild positive affect, of the sort that most people experience every day, improves creative problem solving, facilitates recall of neutral and positive material, and systematically changes strategies used in decision-making tasks” [30].

Based on study of wayfinding, experience design and emotion, a new people-centered approach as what I call *positive wayfinding experience* is proposed. A positive wayfinding experience should be functional - effective, efficient, and at the same time pleasurable and enjoyable to the people. A positive wayfinding experience is an approach that moves beyond problem-solving approaches to design, which encourages a holistic view of people, evaluating the quality of design on the basis of a wider relationship between a wayfinding experience and the people.

It is important to clarify that the purpose of this thesis is not to suggest the predominance of emotional or aesthetic considerations over others. Emotion is only part of the positive wayfinding experience, the integrated process allows us to look at environment, information, service and emotion as a whole. It is to advocate better balance of major design dimensions in wayfinding. Positive wayfinding experience is a holistic approach by incorporating the extra dimension of emotion, by seeking the hidden dimension of human needs, so that people will have pleasure or enjoyment in the wayfinding experience.

Under different circumstances, people have different wayfinding needs. A taxonomy of wayfinding experiences based on wayfinding needs instead of functions of the site is proposed. Strategies for wayfinding should be modified accordingly to better accommodate different

wayfinding needs. A case study of wayfinding experience at IKEA, MN is analyzed to indicate how a wayfinding system works for different wayfinding needs. Other examples are shown and analyzed to indicate how a wayfinding system affects people's emotion.

## CHAPTER 2. WAYFINDING

Wayfinding can be viewed as one of the earliest human activities necessary for survival. Most of the early wayfinding activities are tightly connected to homing behaviors: a hunter finding his way home after a day's hunting, a fisherman heading back to the land after spending a day in the sea. It is also true for people in the modern age. In his paper *Human Wayfinding and Cognitive Maps*, Golledge pointed out that: "For humans, home-based-generated trips dominate the activity schedules of most individuals and aggregates of people in neighborhoods, communities, and regions, with more than 50 percent of daily trips being home-based-generated" [51].

Long before compass, sextant, clocks and other advanced devices such as the satellite-dependant Global Positioning System (GPS) were invented for wayfinding tasks, people had certain ways for orientation. It can be the sun, the moon, the stars, ocean swells, or winds. It can be a certain point, for example, a house. It can be a familiar object: a tree nearby the house, a rock, a creek, etc. Or, it can be a familiar path or the edge of an island.

"From accounts of anthropologists, for example, we infer that primitive man is normally deeply attached to the landscape that he lives in" [64]. With the invention of compass, "the first instrument that allowed navigators... to determine their direction quickly and accurately" [23], human beings started to explore the world to an extent that they could never reach before. With the invention of compass, "the earth would never be seen the same way again" [23]. It helped people to leave the places they were familiar with and explore the unknown.

Historically, the need for people to communicate or move necessitated the development of skills and procedures for travel. A rich collection of terms and concepts has developed since "travel is so fundamental to human existence" [51]. The Oxford English Dictionary

has the definition for *wayfarer* (1440) as “a traveller by road, especially one who journeys on foot,” *wayfare* (1547) as “to journey or travel, especially on foot,” and *wayfaring* (1536) as “journeying, travelling; an instance of this.”

But wayfinding as a discipline did not gain much development until the 20th century. The word *way-finding* was coined in 1960 by Kevin Andrew Lynch (1918 - 1984), the American urban planner, in his influential book *The Image of the City* and later became *wayfinding* in the mid-1970s. Architects, urban planners, landscape architects, environmental graphic designers as well as behavioral and cognitive psychologists have been involved in the multidisciplinary study of wayfinding.

## 2.1 Evolution of Wayfinding Study

“Spatial orientation - knowing where one is relative to objects in the surrounding environment” [89], is the predecessor of wayfinding that first appeared in neuropsychological literature in the late 19th century. Studies were carried on by neuropsychologists to “establish reliable correlation between cognitive or behavioral deficits and specific foci of neurological damage” [26]. From case studies of patients who were victims of brain lesions, neuropsychologists found out that with certain damages to the brain, people would be incapable of recognizing spaces visited on previous occasions or of linking spaces mentally into an overall representation. This representation people have of their surrounding environment is a psychological concept called *cognitive map*, which was coined by American psychologist Edward Chace Tolman (1886 - 1959) in his 1948 work, *Cognitive Maps in Rats and Men*. Cognitive map is a term used to specify the internal representation of spatial information [51]. “The synonym ‘spatial cognition’ is also used by psychologists and ‘image’ is most commonly used by planners” [85]. Despite varied terminology used to describe them, cognitive maps can be used to determine one’s location, how to get from point A to point B, or how to communicate spatial knowledge to others [51].

As the first one to use the word *way-finding*, Lynch used the term *environmental image* instead of *cognitive map* in his 1960 book *The Image of the City*, which is the result of a five-year study on how users perceive and organize spatial information as they navigate through

cities. For Lynch, it is the environmental image of a city that plays an important role in urban wayfinding tasks:

“In the process of way-finding, the strategic link is the environmental image, the generalized mental picture of the exterior physical world that is held by an individual. This image is the product both of immediate sensation and of the memory of past experience, and it is used to interpret information and to guide action” [64].

Lynch asserted that an environmental image consists of three components: identity, structure and meaning. He used the word *imageability* to describe the physical qualities of identity and structure in the mental image of an environment. The word *imageability* can also be called legibility or visibility. Lynch believed that a good environment image, or a legible surrounding “gives its possessor an important sense of emotional security,” “heightens the potential depth and intensity of human experience,” and “offers a framework for communication or conceptual organization” [64].

According to Lynch, there are three approaches that can strengthen the mental image of an environment: by “symbolic devices” [64] such as a map, a set of written instructions or some machines installed for giving direction; by retraining of the perceiver; or by reshaping the built environment, which is the center of his study in the book.

Lynch’s theory about elements of city image, which is perhaps the most well-known and most quoted part of his book, has great influence in environment design and wayfinding design. Terms he used to define elements of a city: paths, edges, districts, nodes, and landmarks continue to be widely used today.

- Paths: the channels along which the observer customarily, occasionally, or potentially moves.
- Edges: the linear elements not used or considered as paths by the observer. They are boundaries... edges may be barriers.

- Districts: the medium-to-large sections of the city, conceived of as having two-dimensional extent... which are recognizable as having some common, identifying character.
- Nodes: points, the strategic spots in a city into which an observer can enter, and which are the intensive foci to and from which he is travelling.
- Landmarks: another type of point-reference, but in this case the observer does not enter within them, they are external.

Lynch's major contribution is that he recognized the importance of environmental image for wayfinding tasks. The five elements that he used to reinforce environmental image are concepts with flexible applications. For example, an edge can be a riverbank, a row of trees, a piece of wall; a landmark can be a water tower, a lake, a mountain etc. Also, Lynch briefly pointed out the fact that a good environment image can have strong expressive meaning and give people emotional satisfaction, which is mostly about security. Lynch did mention that symbolic devices can strengthen environmental image, but he did not talk specifically about functions of symbolic devices and how they should work together with the environmental image to help people find their way around. As wayfinding planner Paul Arthur (1924-2001) pointed out in the 1987 SEGD conference, Lynch saw wayfinding essentially as spatial orientation: "Where am I in relation to the environment?" and "Where does my destination lie in relation to where I am now?" But it could not tell "What do I have to do to get to my destination" [28].

Towards the end of 1970s, research interest shifted from the study of the product (cognitive map) to the study of the process (cognitive mapping) and the concept of *wayfinding* was baptized. It was used to replace the term *spatial orientation* by cognitive psychologists such as Steven Kaplan, Roger Downs, and David Stea in order to incorporate "all the perceptual, cognitive, and decision-making processes necessary to find one's way" [29]. Compared to the term spatial orientation, which is perfectly suited to described "the static relationship" [29] of a person to his/her environment, wayfinding is a new approach to studying people's movement and a more dynamic relationship between a person and his/her environment. The

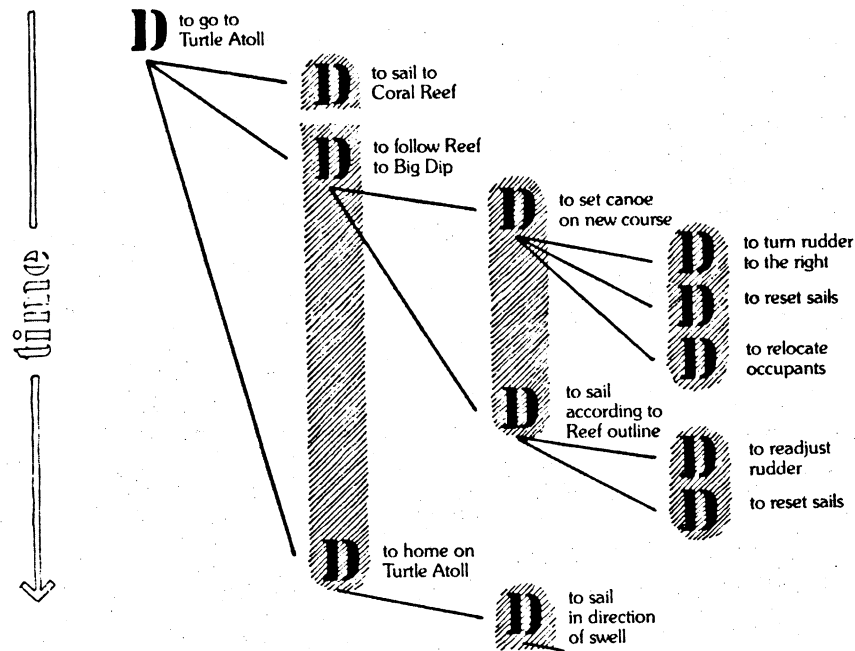
word wayfinding cannot be found in standard English-language dictionary, but it is increasingly used by psychologists to refer to “purposeful movement to a specific destination that is distal and, thus, cannot be perceived directly by the traveller” [26]. It is a concept that involves interactions between attributes of the traveller and attributes of the environment. Hence it is reasonable to say that to a certain degree, no two wayfinding experiences are exactly the same, even those repeated travels between familiar destinations.

The 1984 work of the architect and environmental psychologist, Romedi Passini, *Wayfinding in Architecture*, was recognized as one of the earliest publications devoted to the study of wayfinding. The book was written to serve as “a general reference” on wayfinding and as “a design aid to the practitioner” [84]. Passini gave a definition to spatial orientation as “a person’s ability to mentally determine his position within a representation of the environment made possible by cognitive maps” [84], and extended the definition to include “an alternative ability that consists in determining what to do in order to reach a place” [84]. However, in order to underline the “dynamic and comprehensive” aspects of the concept, Passini further articulated the term wayfinding as a dynamic process of “spatial problem solving” [84].

Passini’s major contribution is defining the process of wayfinding as: developing decision plans (Figure 2.1), executing decision plans, and processing environmental information. Passini used the term *environmental information* to describe all relevant information available to a person when completing a wayfinding task, which he divided into three major information sub-groups:

- Architectural information: architectural and spatial characteristics of a setting that are inherent in the building itself.
- Graphic information: signs, maps, information booths, etc.
- Verbal instructions: consulting other people on site such as passerby, occupants of the building, security guards, etc.

Compared to Lynch, Passini focused on not only architectural and spatial characteristics of a setting, but also graphic information such as signs, maps, information booths and verbal



**Figure 3.3**  
Decision plans.

**Figure 2.1** Decision Plans (Source: Romedi Passini, *Wayfinding in Architecture*, 1984)

instructions that are crucial for the three stages of wayfinding process. Passini analyzed some graphic information such as signs and maps, but it is clear that Passini talked about wayfinding in this 1984 publication mainly from an architect's point of view. Collaboration between architects and environmental graphic designers should be closer.

Eight years later, a book by Paul Arthur and Romedi Passini, *Wayfinding: People, Signs, and Architecture*, was published in order to make wayfinding "its impact on the design profession" [29]. In this book, they continued Passini's description of wayfinding as spatial problem solving and further specified it as "a term introduced to describe the process of reaching a destination, whether in a familiar or unfamiliar environment" [29]. Also, the process of wayfinding was reworded as "decision making, decision execution, and information processing" [29].

One of the most significant contributions of the 1992 book is that for the first time in formal wayfinding study, the status quo that architects design buildings, while graphic designers come along at the end of the building process and install some signs was questioned. It is pointed out in the book that "a close relationship at an early planning stage is of paramount



importance in good wayfinding design” [29] (Figure 2.2). Arthur and Passini organized the information of wayfinding design into three components: architectural components, graphic components, and audible and tactile components. Senses such as hearing and touch were introduced in wayfinding design. Compared to Passini’s work eight years prior, audible information introduced here was not just about consulting other people, but also about training of the attendants, audible systems such as audible maps, public address systems, mechanical sounds such as bells, buzzers, alarms, and voice synthesizers. Tactile information is also explored in the book. Another new proposal from Arthur and Passini is that wayfinding design involves more than architects and graphic designers: “Management plays an important role too” [29]. Management of wayfinding system helps to update new wayfinding information and make sure the existing ones work effectively.

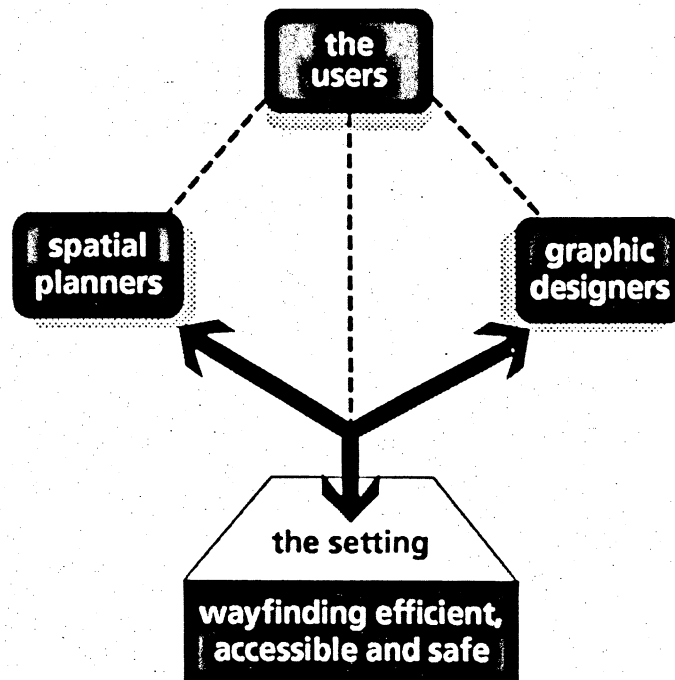


Figure 2.2 The wayfinding pyramid (Source: Paul Arthur and Romedi Passini, *Wayfinding: People, Signs, and Architecture*, 1992)

In the development of wayfinding design, there is an organization that plays an important role, the Society of Environmental Graphic Design (SEGD). It is an international, non-profit design organization founded in 1973 with offices in Cambridge, Massachusetts (now in Wash-

ington, DC), and ever since has assumed a leading and influential role in raising professional standards and in broadening an understanding of the graphic designer's function in the environmental and architectural contexts [29]. For example, soon after the American with Disability Act (ADA) was signed into Law in July 1990 to prohibit discrimination on the basis of disability, SEGD published *What is ADA?* (1992) [82], *Integrating the ADA Into your Practice* (1992) [46] and *The Americans with Disabilities Act White Paper* (1993) [1] to clarify and interpret the ADA signage requirement for designers from all disciplines, their clients, sign manufacturers, building owners and facility managers.

Many design companies offer wayfinding service to clients at places such as airports, subway stations, healthcare facilities, museums, universities, companies, sports and recreations, towns and cities. In the 1999 book *Wayfinding: Effective Wayfinding and Signing System: Guidance for Healthcare Facilities* by Colette Miller, wayfinding consultant and senior designer at Information Design Unit, a comprehensive introduction of wayfinding and its strategy is presented. This book is published based on research commissioned by NHS Estates and carried out by their Information Design Unit. The research involved the study of 19 healthcare and 8 non-healthcare sites. Over 1,000 questionnaires were handed out to visitors and staff during the interviews.

In the book, Miller defined wayfinding as a problem-solving process (Figure 2.3) that will be affected by three factors: people factors, environmental factors, and information factors. She declared that "wayfinding is a multi-sensory task" [72]. Sight, sound, touch and smell can be incorporated to increase the effectiveness of a wayfinding system. Also, efforts should be made for people with disabilities.

Then Miller started to introduce strategy of developing effective wayfinding systems. "Simply putting up new signs in place of old ones, or where there is a blank wall, will rarely solve wayfinding problems or produce an effective wayfinding system" [72]. A thorough wayfinding strategy with eight key factors are introduced in the book. Here is my interpretation:

- The understanding of wayfinding as a multi-disciplinary task that requires close collaborations of people with different expertise.

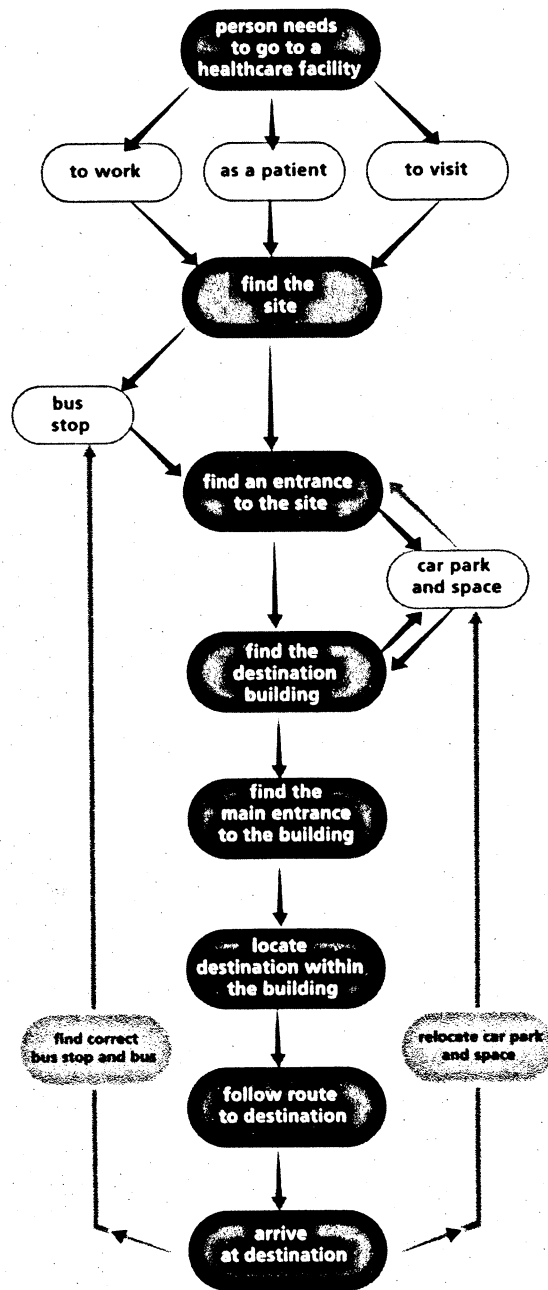


Figure 2.3 A typical series of tasks that require decisions to be made when going to a healthcare facility. (Source: Colette Miller, *Wayfinding: Effective Wayfinding and Signing System: Guidance for Healthcare Facilities*, 1999)

- Understand the site users: age, disability, language, etc.
- Consistent wayfinding information with pre-visit information, en-route information, on-site information and locational information.
- Simplify the site layout and reinforce environment features such as entrances and exits, circulation paths, districts, nodes (or transition points), vertical circulation (stairs, elevators), and landmarks.
- Color-coding is an effective way in assisting wayfinding task in some cases but there are a number of disadvantages to consider.
- Terminology, abbreviation and dual language should be used consistently.
- Signs systems. Typeface and type style, type size, text layout and grouping, text and arrow alignment, emphasizing information, maps, directories, as well as color combination, positioning, illumination and methods of construction are all part of the strategy. In Miller's terms, signs system includes directional signs, locational signs, directories, site maps and safety signs.
- Use standard, internationally recognized symbols and carefully develop new symbols.

We can find different but similar strategies in many other wayfinding studies and practices. It is fair to say that wayfinding has reached its mature stage since Lynch first baptized the term *way-finding* about half a century ago.

## 2.2 Limitation of Current Wayfinding Solutions

Designers have been able to solve wayfinding problems comprehensively. It begins with a thorough study of the environment: entrances and exits, circulation paths, districts, nodes (or transition points), vertical circulation (stairs, elevators), and landmarks. These architectural attributes might be reinforced for wayfinding purposes in some cases. A signage system is then introduced to provide overview of the site, routes, identification, instructions and information. Problems remain even in the most considerate wayfinding design.

### 2.2.1 Anytime, Anywhere

Users can hardly get information whenever and wherever they want. With web sites such as *Mapquest* (<http://www.mapquest.com/>) and *Google Maps* (<http://maps.google.com/>), people can get information of how to drive from location A to location B before their actual visit. But most of the time, people can hardly find maps within a campus or layouts of a building. With a fixed signage system, users have to always stay on routes that have been carefully designed by wayfinding designers. Signage systems were questioned to be directing men and cars in “restrictive, authoritarian way, with authoritarian gesturers” [32]. Is it possible that users can have access to information more freely so that they can get it at anytime, anywhere?

### 2.2.2 Adaptability

There is no way for users to get information just the way they want. One of the most recognized problems is language difference. In international public spaces such as airports or Olympic venues, a multi-language signage system is a big problem for wayfinding designers. International symbols have been put to use to eliminate the use of languages, but symbols alone cannot communicate well all the time. As Robert E. Horn pointed out in his paper *Information Design: Emergence of a New Profession*, fewer than half of the respondents could clearly understand what 86 of 108 international symbols meant in a study. Only three of symbols were understood by more than two-thirds of the sample [58]. Information boards for wayfinding purpose nowadays are designed for all users. They are inevitably crowded and slow down the process of information searching even with a well-organized information design. Also, most of the wayfinding solutions depend greatly on vision. For people with visual impairment, they can hardly use other kinds of input such as sound, texture, or smell to help them find their way. In most cases, Braille messages are available only on the nameplate of the destinations. As the pattern owner of *Raynes Rail*, a Braille and Audio Handrail System, Raynes questioned: “How could we honestly label doors with Braille without providing a directional link from the entrance of the building to the designated door?” [69] Is it possible that the information can be easily adapted according to personal needs?

### 2.2.3 Flexibility

It is not convenient to update a fixed signage system. Before maintenance of a wayfinding system was recognized as a crucial part of wayfinding design, outdated information had been a big problem in many places. "Wayfinding systems must respond with speed and sensitivity to changes, or else they become more than outdated: they become liabilities" [37]. With better management, information can be updated whenever there are new changes of wayfinding information. Physically changing a sign takes manpower and cost of material. Some times the design of the signs has to be changed since materials used on the original design cannot be found anymore, which causes inconsistency. In airport and some other locations, electronic design is applied to create a dynamic wayfinding system. But an electronic information panel is not always appropriate in other places and interface design of the panel is still questionable.

### 2.2.4 Multi-disciplinary Collaboration

The lack of collaboration between environment designers and environmental graphic designers remains an issue in many wayfinding projects. First of all, graphic designers are oftentimes invited to a project after the building has been built. "Wayfinding difficulties are usually explained by inadequate signage. Quite often, though, the deficiency is architecture... no signage can fully remedy that shortcoming" [85]. The status quote that environmental graphic designers are asked to create a signage system when clients realized that there is wayfinding problems of the site is considered by Mijksenaar a "negative approach," since the problem should be prevented in the first place [34]. With a built environment that is totally not imageable, even the most comprehensive signage system cannot help.

Secondly, even when graphic designers are finally invited to help improve the wayfinding system, they are limited by architects who tend to believe that signs draw too much attention and destroy the beauty of the architecture. Realizing the problem, Paul Arthur in his speech at the 1987 SEGD conference called on graphic designers to "overcome our reluctance to work with architects. More importantly, we must overcome their indifference to us. We must overcome their conviction that we are nothing more than a bunch of inferior desecrators intent

on crapping up his building” [28]. The 1989 SEGD conference was dedicated to the theme of collaboration between graphic designers and architects. The 1992 book by Arthur and Passini also called on the importance of collaboration. But things do not change over night. As published in *Architects’ Journal* at the end of 2000, Paul Mijksenaar recalled one of his meetings with the architects when he was working on redesigning signage across airports in the New York City: “one of the architects wanted me to make sure the signs did not draw attention away from their building.” But Mijksenaar believes that “if there are signs there then they should dominate” [34]. Another essay published in *Architects’ Journal* in the same year also talked about “architects’ love/hate relationship with signage” [56].

Environment features such as entrances and exits, circulation paths, districts, nodes (or transition points), vertical circulation (stairs, elevators), and landmarks can be designed by architects to reinforce the cognitive map, or as Lynch called, environmental image. As the internal spatial representation of environmental information, cognitive map is not directly observable. Graphic information such as signs, maps and information booths on the contrary “are directly observable, are external” [52]. It is only through close collaboration between environment designers and graphic designers as well as cognitive psychologist that a more enjoyable wayfinding experience can be created.

### 2.2.5 Emotion and Wayfinding

Recently, importance of emotions, especially that of the positive ones has received increasing attention from psychologists, product designers and the field of HCI. Research has shown that “emotion is a necessary part of life, affecting how you feel, how you behave, and how you think” [80]. Experiments also proved that aesthetically pleasing objects enable people to work better [103] [105] [63] [104]. But most research about wayfinding to date focuses on negative emotions such as stress, fear, anxiety and anger and how a better planned wayfinding system can help to avoid these negative emotions. The role of positive emotions in wayfinding behavior are less explored.

Five limitations of current wayfinding solutions were pointed out, only one of which will

be addressed in detail in this thesis. Emotion, especially positive emotion and its potentials in wayfinding is the focus of this thesis. Arguments on positive emotions and their relationship with wayfinding will be elaborated in chapter four and five. Before the arguments of wayfinding and emotion, experience design, a design approach that look into a deeper level of human needs and view design as a tool for creating experience for its users should be introduced. An exploration into experience design will help wayfinding designers to look at the total picture of wayfinding. Research and discoveries in experience design will help to project a new direction for wayfinding.



### CHAPTER 3. EXPERIENCE DESIGN

In the age of Renaissance, an architect was at the same time a sculptor, a painter, or a poet. Design of a church, for example, was integrated with the design of the interior, doors, windows, sculptures, and paintings to create a sacred experience for the people. The impact of the experience was strong when people were inside, outside or around the church, and many years after.

Before the Industrial Revolution, a silversmith would design a teapot, build it and sell it all by himself. The same person would create an object from the initial idea to its final production. Things changed greatly after the Industrial Revolution. With the development of mass production, a task was divided into many segments and people were assigned to work on a part of it. The division of labour helped people become experts of a certain task, but at the same time, people became parts of a machine/system and lost the sense of the whole process that a silversmith used to have.

From the history of design, we can see that many designers and scholars have tried to regain a holistic approach of design through years. These attempts can be seen from the idea of *Gesamtkunstwerk* in the 19th century, Organic Design later on, ergonomics / human factors since World War II and study of human-computer interaction since 1980s. At the end of the 20th century, a new discipline that focuses on a much more holistic approach was introduced. It is called experience design or user experience. Experience design integrates many previous disciplines into holistic solutions. Everything a user encounters during the process is crucial for creating a positive user experience. Recently, research shows that “emotion makes you smart,” emotion affects how you feel, how you behave, and how you think [80]. The role of emotion in creating positive experiences has gained increasing attention from psychologists,

product designers and the field of HCI. It is time to move beyond usability, and gain a holistic understanding of people, physically, cognitively and emotionally.

### 3.1 Evolution of Experience Design

Evolution of experience design can be seen as shifts of design focus: from focusing only on one or a few aspects of a product/environment to viewing the product/environment as an integrated whole, from focusing only on the product/environment itself to studying various relationships between the product/environment and the people.

In the history of design, the first attempt in trying to create a holistic design solution can be dated back to the 19th century when the idea of *Gesamtkunstwerk* was introduced. “Originally the concept of *Gesamtkunstwerk* was associated with the operas of Richard Wagner (1813-1883), which blended music with drama” [47]. Designers such as Charles Rennie Mackintosh (1868-1928), Frank Lloyd Wright (1867-1959) (Figure 3.1), Joseph Hoffman (1870-1956) and Peter Behrens (1868-1940) took up this concept of completely unified design by integrating design of architecture and interiors, and by ensuring their architecture were in harmony with the surroundings so that architecture design was related with its inside - the interiors, and its outside - the environment.

Mackintosh and Wright later on pushed the concept forward and became pioneers of a holistic and humanized approach to design, Organic Design. Crucial to the approach of Organic Design was the consideration of how individual elements connected visually and functionally so that the complete effect was greater than the sum of its parts. The American designer Eliot Fette Noyes (1910-1977) defined Organic Design as:

“an harmonious organization of the parts within the whole, according to structure, material, and purpose. Within this definition there can be no vain ornamentation or superfluity, but the part of beauty is none the less great - in ideal choice of material, in visual refinement, and in the rational elegance of things intended for use.” (*Organic Design in Home Furnishings* catalogue, Museum of Modern Art, New York, 1941)



Figure 3.1 *Fallingwater*, the architecture, the interior and furniture that designed by Frank Lloyd Wright, 1935. "It is a supreme example of Frank Lloyd Wright's concept of organic architecture, which promotes harmony between man and nature through design so well integrated with its site that buildings, furnishings, and surroundings become part of a unified, interrelated composition" [18]. (Source: Neil Levine, *Frank Lloyd Wright's Fallingwater*, 1999)

“It was not until the late 1920s and the 1930s that Alvar Aalto (1898-1976), one of the greatest advocates of Organic Design, pioneered a humanizing and modern organic vocabulary of form” [47]. Aalto’s designs were holistically conceived as earlier organic architecture, but his main concern was about how the form and the material of his design could be designed in a way so that it established an emotional connection between his designs and the individual users. His furniture designs are both visually and sensorially pleasing to users (Figure 3.2). Alvar Aalto can be seen as one of the major designers that concerned about not only the design itself but also its emotional impact on users.

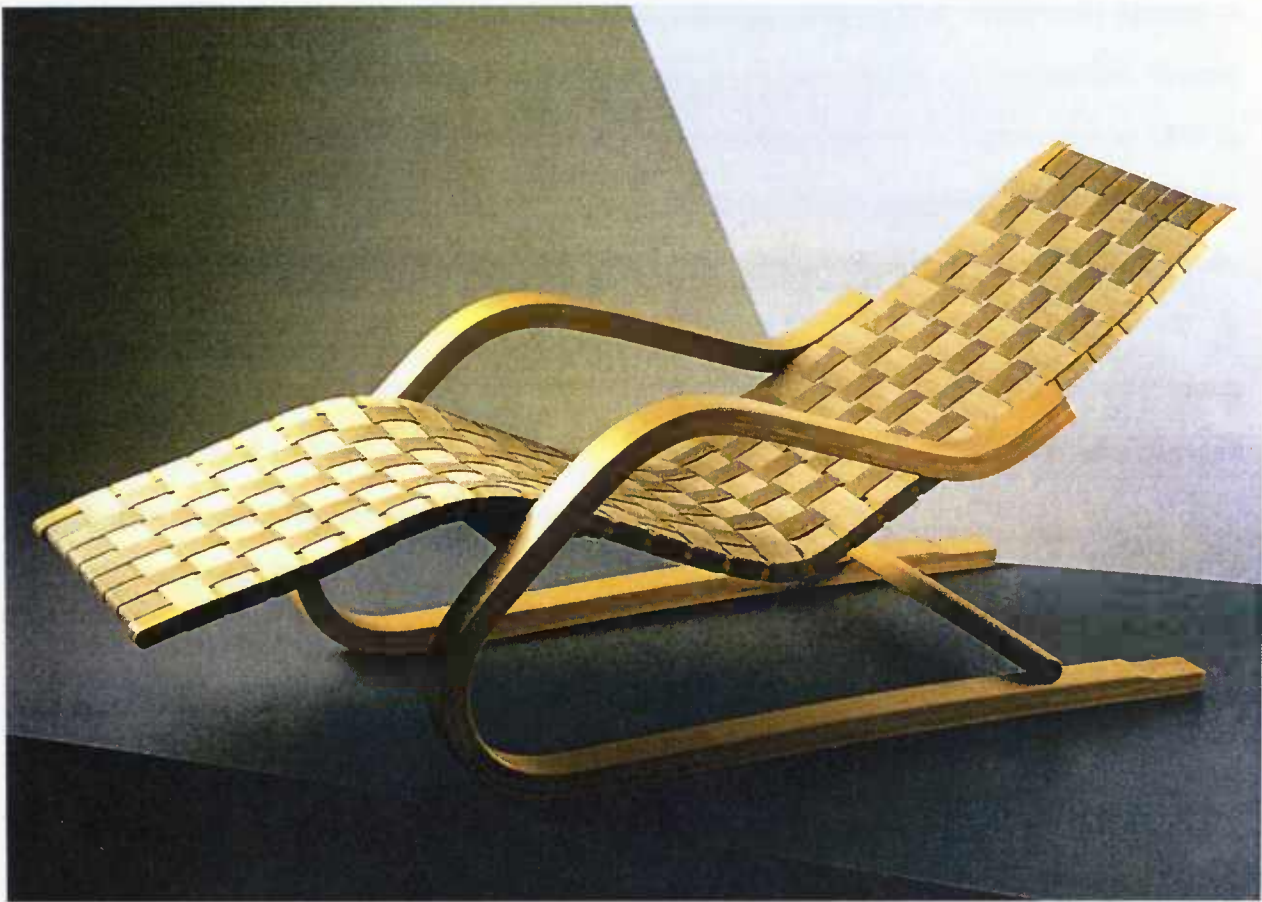


Figure 3.2 Model No. 43, designed by Alvar Aalto, 1936. Bent laminated wood and solid birch frame with textile webbing. (Source: Charlotte Fiell and Peter Fiell, *Design of the 20th Century*, 1999)

“During the early modern period, the machine assumed priority in design considerations, and the operator came last” [102]. One example is that early aircraft were designed only for



operators of a certain size [102]. During World War II, scientists were designing advanced systems without fully consideration of the people who would be using them. It gradually became clear that systems and products would not function well if they were not designed with consideration of the people who would be using them. “The concept that machines, not personnel, win wars gave way to efficient man-machine relationship” [102]. This awareness of people’s requirements resulted in the discipline of ergonomics.

Human factors is a term used widely in North America, while the synonymous term ergonomics took root in a European context. Thus the two terms will be used interchangeable in this thesis. The term ergonomics was coined in 1949 by scientist K F H (Hywell) Murrell to describe the new profession that focused on the study of human-equipment interaction. Recent research shows that there is evidence of a far earlier citation of the word ergonomics in 1857 in a Polish newspaper [91]. Still it’s Murrell who independently derived the word from two ancient Greek words *ergo* (work) and *nomos* (laws) and popularized the word. *The Ergonomics Research Society* was founded in London in 1949 as the first of such society in the world. It later changed its name to *The Ergonomics Society*. The USA equivalent of *The Ergonomics Society* was formed in 1957 as *The Human Factors Society*, the name of which was changed later to *The Human Factors and Ergonomics Society*.

Henry Dreyfuss (1904-1972), the American industrial designer, was considered by many designers as the father of ergonomics in product design. Dreyfuss published one of his most influential books, *Designing for People* in 1955. In chapter 2: *Joe and Josephine*, Dreyfuss showed the relationship between human body (men and women) and the machine that he/she was working on or the environment that he/she was working in [42]. Later in 1960, another book called *The Measure of Man and Woman: Human Factors in Design* was published to further explore this relationship. It’s an ergonomic data guide compiled from military records by the Dreyfuss office. It popularized the idea of fitting products to human scale. Dreyfuss was probably the first major designer to rely heavily on the use of anthropometric data for product designs. He focused on design problems related to the human figure, working on problems from the inside out, and believed that machines adapted to people would be the most efficient. The

latest version of *The Measure of Man and Woman: Human Factors in Design* was published in 2002 by the Dreyfuss Associates to assembly “the most vital data currently available to assist designers in creating products and environments to better accommodate human needs” [102]. Statistics information inside the book contains not only data of average people, but also data of “the differently abled” [102], pregnant women and children.

There are many definitions of ergonomics. Alexander and Pulat defined ergonomics as “the study of the interface or interaction between humans and the objects they use and the environment they function in” [25]. Another definition of ergonomics adopted by the IEA (*International Ergonomics Association*) Council stated that:

“Ergonomics (or human factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance.

Ergonomists contribute to the design and evaluation of tasks, jobs, products, environments and systems in order to make them compatible with the needs, abilities and limitations of people” [3].

The significant contribution of the study of ergonomics is that for the first time in the history, the importance of people and their physical relationships with the the objects they use and the environment they function in was studied systematically. Measurable data were collected to help to create a better working and living environment for people. For example, figure 3.3 shows detail information about the sizes of a large man - 99 percentile US population and a small woman - 1 percentile US population and their relationships with a car, so that car designers can use these data to design a car that better accommodates people’s need. Figure 3.4 shows ranges of size for designing manual controls for US population. Ergonomists understand interactions between people and other elements of a system, and design the system in a way so that it provides efficiency, comfort and safe for the people who are using it. But as Dr. Patrick W. Jordan, an international design and marketing consultant criticized, traditional ergonomics approaches are mainly concerned with “physical aspects of product use” (Figure 3.3, 3.4) [60].

Figure 3.3 Constant factors in vehicle design (Source: Alvin R. Tilley, *The Measure of Man and Woman: Human Factors in Design*, 2002)

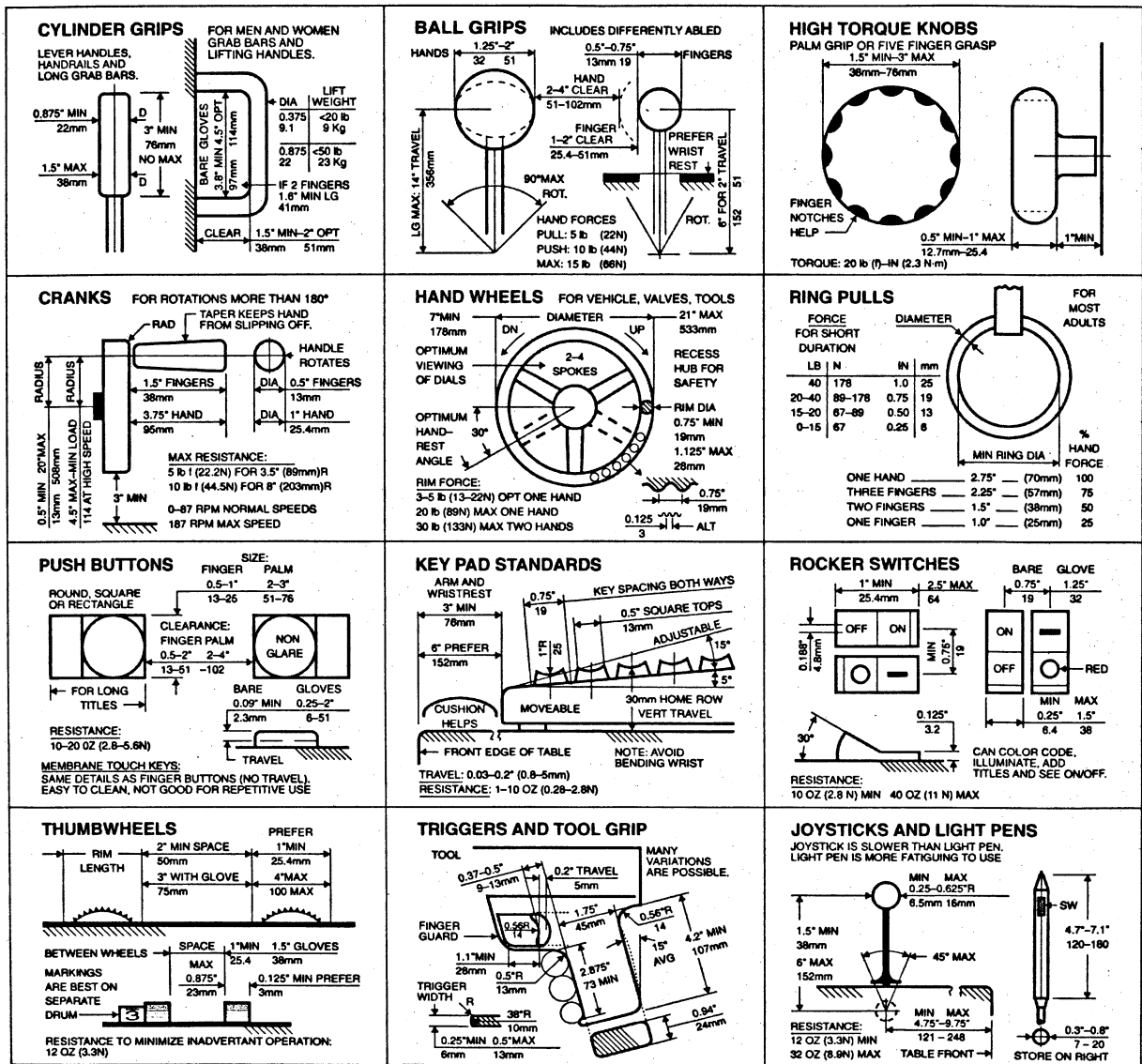


Figure 3.4 Manual controls (Source: Alvin R. Tilley, *The Measure of Man and Woman: Human Factors in Design*, 2002)



Ergonomists have always been interested in taking human users into account during the design process. With the advent of computer technology, the Internet and the World Wide Web, “it is only natural that they would be involved with the design of computer, software, and HCI (Human-Computer Interaction) more generally when the field emerged” [86]. Through the early 1970s, *The Human Factors and Ergonomics Society* “played the dominant role in introducing the concepts of cognitive psychology and psychological methodology into the design and evaluation of human-computer systems” [86].

In 1982, a conference called *Human Factors in Computer Systems* was held by the *Association for Computing Machinery* (ACM) *Special Interest Group on Social and Behavioral Computing* (SIGSOC) in Gaithersburg, Maryland. “This conference has come to be regarded as the first major conference devoted to human performance issues in computer system design, development, and use” [61]. Ever since then, the study of human-computer interaction has become a hot topic and been actively discussed by both academy and practice. At the 1982 meeting, SIGSOC changed its name to SIGCHI (the *Special Interest Group on Computer-Human Interaction*, <http://www.acm.org/sigchi/>). The series of SIGCHI conferences officially began in 1983 and the first *INTERACT Conference* began in 1984. The annual SIGCHI Conference and the biannual *INTERACT Conference* remain the premiere HCI forms in the field. Definition of HCI adopted by SIGCHI states:

“Human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them” [45].

Usability, “the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use,” [21] is one of the most popular topics in the field of HCI. The field of usability design took its root in the cognitive sciences - a combination of psychology, computer science, human factors, and engineering. It focuses on ease of use and functionality based on measurable, observable cognitive activity. The word *satisfaction* being used in the definition of usability was defined by the *International Standards Organization* as: “the level of comfort that the user feels

when using a product and how acceptable the product is as a vehicle for achieving their goals” [21]. Still, as Jordan criticized: “the human-factors profession has traditionally operationalised ‘satisfaction’ in a manner that is limited to the avoidance of physical or cognitive discomfort” [60].

Jakob Nielsen, who is generally regarded as the leading authority on usability, defined the usability of a computer system in terms of five attributes: learnability, efficiency, memorability, errors, and satisfaction [77]. In order to understand why people have difficulties working with something - a web site, a software, a digital device, etc., we need to understand how people act to achieve a goal. In the influential book *The Design of Everyday Things* (the first title of the book was *The Psychology of Everyday Things*), Donald Norman introduced the concept of seven-stage of action [79]:

- Forming the goal
- Forming the intention
- Specifying an action
- Executing the action
- Perceiving the state of the world
- Interpreting the state of the world
- Evaluating the outcome

In order to observe people’s behavior and problems that they have when they are working with something (such as a web page, a software, an ATM machine, a cell phone or a palm), usability testing, a means for measuring how well people can use something for its intended purpose, was introduced in design process. According to Mike Kuniavsky, there are four major steps in the process of conducting a usability test [62]. Here is my interpretation:

- Define the audience and their goals. Who are your users? Why do they want to use the product?

- Create tasks that address those goals. What are the most important functions of the product?
- Get the right people. Recruit end users or potential end users of the product.
- Watch them try to perform the tasks. They are not the ones being tested, the product is. Ask them to think aloud.

User profiles, objective data such as time to learn, error rate, time to complete a task, and subjective information such as users' perceptions of ease-of-use, usefulness from the usability testing are collected and analyzed after the test to improve the functionality of the products.

In the early 1990s, Nielsen popularized the idea that “five users is enough” for a usability test, which was described by a mathematical model devised by Bob Virzi (Figure 3.5). There are some studies that do not support the statement of “five users is enough.” “Lewis (1994), however found that for a very large product, a suite of office productivity tools, 5 to 10 participants was not enough to find nearly all of the problems” [44].

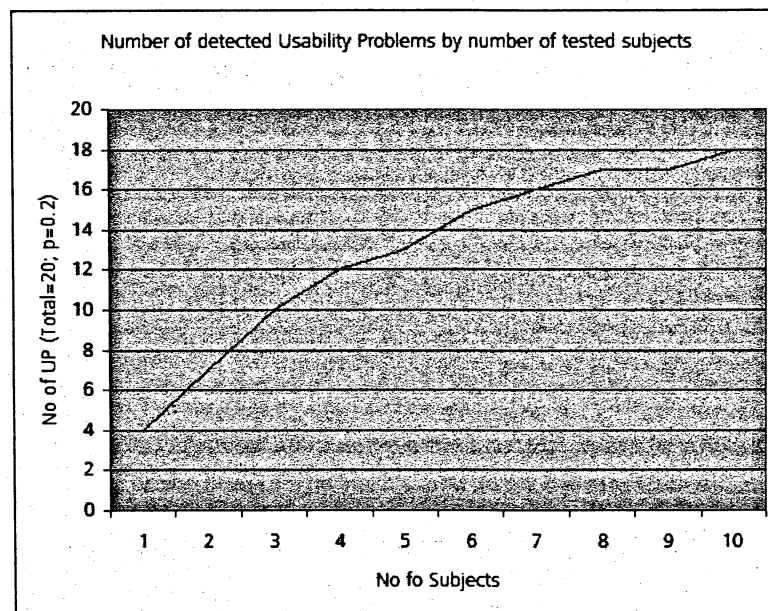


Figure 3.5 An idealized curve showing the number of participants needed to find various proportions of usability problems. (Source: Joseph S. Dumas, *The Human-Computer Interaction Handbook*, 2003)

Contribution of usability testing is that it is a means to observe users' behavior with the product or the prototype to find out problems people might have when using them. It reinforces the idea that design is not for the designers or their clients, but the users. As Donald Norman pointed out in the book *The Design of Everyday Things*: "designers are not typical users. They become so expert in using the object they have designed that they cannot believe that anyone else might have problems; only interaction and testing with actual users throughout the design process can forestall that" [79]. "Usability is measurable either quantitatively or qualitatively" [22]. It is mainly about the functional aspects of a design: Does it work? Is it easy to use? Is it easy to understand? Is it intuitive? etc.

While traditional ergonomists concerns mostly about physical aspects of a product use, usability testing assures cognitive aspects of a system. Names used to identify usability specialists have changed accordingly from ergonomists (or human factors specialists) to usability engineers to User-Centered Design (UCD) specialists. In general, the activity of UCD focuses on "understanding the needs of the user as a way to inform design" [61]. While most study of UCD emphasis on physical, cognitive, social, cultural issues, the role of emotion in design is receiving increasing attention. It is not enough to build products that function, that are understandable, learnable and easy to use. "We also need to build products that bring joy and excitement, pleasure and fun, and yes, beauty, to people's lives" [81]. Traditional cognitive approaches to product usability have tended to underestimate, fragment or neglect emotion from a holistic understanding of the user experience.

With the awareness that design is not merely about physical and cognitive quality of a product or service, but a holistic user experience, a newly named discipline, experience design, emerged at the end of the 1990s. As a discipline that is still "somewhat in its infancy" [95], experience design is also known as user experience design, experiential marketing, customer experience design, experiential design, or brand experience. There are also various definitions of experience design.

In 1998, Ric Grefe, AIGA's executive director, offered Clement Mok and Terry Swack services and support to organize the first *Advance for Design Summit*, from which the AIGA

*Experience Design Community* evolved. In *The Nantucket Manifesto*, result of the summit, it stated: “We are faced with the task of building a new approach to design, which yields useful, useable, and desirable products for people” [13]. AIGA uses the term *experience design* to describe a community of practice - not a single profession and defines experience design as:

- “A different approach to design that has wider boundaries than traditional design and that strives for creating experiences beyond just products or services.
- The view of a product or service from the entire life cycle with a customer, from before they perceive the need to when they discard it.
- Creating a relationship with individuals, not targeting a mass market.
- Concerned with invoking and creating an environment that connects on an emotional or value level to the customer.
- Built upon both traditional design disciplines in the creation of products, services, as well as environments in a variety of disciplines” [13].

Another definition by Nielsen Norman Group, a usability consulting company created in 1998 by the well-known user experience experts Donald Norman, Jakob Nielsen, and Bruce Tognazzini stated that:

“User experience encompasses all aspects of the end-user’s interaction with the company, its services, and its products. The first requirement for an exemplary user experience is to meet the exact needs of the customer, without fuss or bother. Next comes simplicity and elegance that produce products that are a joy to own, a joy to use. True user experience goes far beyond giving customers what they say they want, or providing checklist features. In order to achieve high-quality user experience in a company’s offerings there must be a seamless merging of the services of multiple disciplines, including engineering, marketing, graphical and industrial design, and interface design” [19].

Comparing the two definitions of experience design, a few common understandings can be concluded. First of all, the goal of experience design is to create a holistic user experience, not a single product or service. Everything a user encounters during the process, the environment, the products, the interface and many other elements such as sound and smell or taste, is crucial for creating positive user experience. Secondly, in order to create the holistic user experience, experience design requires integrated combination of many previous disciplines. Finally, a positive user experience should be useful (functionality), usable (usability) and pleasurable (pleasure, joy, fun, excitement, desire, etc.).

A positive experience design concerns not only the physical and cognitive relationships between a design and the people, but also the role of emotion in decision making. The field of HCI has long stressed usability over aesthetics. About twenty years after the first conference devoted to human factors in computer systems, the design and usability community began to pay closer attention to “the aesthetics, or affective aspects of interaction design in the usability evaluation process” [98]. As Norman said in a 2004 paper, *Beauty, Goodness, and Usability*: “usability and understandability are never goals - they are means toward the goal. Pleasure, enjoyment, fun, on the other hand, can be goals” [81]. Sixteen years after the influential book on usability, *The Design of Everyday Things*, Norman claimed: “it is time to move toward the emotional and aesthetic side of interaction” [81].

Recently, there is increasing recognition of the role of emotion in experience design. The *Design & Emotion Society* is established in 1999 after the two-day conference in Delft “as an international network of researchers, designers and companies sharing an interest in experience driven design” [20]. *The First International Conference on Design and Emotion* organized in Delft, the Netherlands in 1999 was a ground-breaking event followed by three successful conferences in Potsdam, Germany (2000), Loughborough, England (2002), and Ankara, Turkey (2004). Issues of emotion and experience in design were raised as an effort to question the established limits and boundaries of the design discipline. The success of these conferences and the increasing significance of the topic have turned the series of *Design and Emotion* conferences into “a leading international forum for the exchange of ideas and information

about various aspects of emotion/experience driven design” [6].

The field of HCI saw the application of emotional design in Human-Computer Interaction. In 2001, *Conference on Affective Human Factors Design* was held in Singapore. Then in 2003, the conference was held in Pittsburgh with the title changed to the *International Conference on Designing Pleasurable Products and Interface* to incorporate study of emotion in interaction design [83].

At the same time, there are also books published discussing relationship between emotion and design. In 2000, Jordan published the book *Designing Pleasurable Products: An Introduction to the New Human Factors*. It is one of the few scientific studies of pleasure and design. Jordan identified four kinds of pleasures that he used as a framework for considering pleasure with products:

- Physio-pleasure: pleasures derived from the sensory organs.
- Socio-pleasure: enjoyment derived from relationships with others.
- Psycho-pleasure: issues relate to cognitive demands of using the product and emotional reactions engendered through experiencing the product.
- Ideo-pleasure: has to do with peoples’ value [60].

Later in 2004, Norman published the book, *Emotional Design: Why We Love (or Hate) Everyday Things*, which can be seen as a counterpart of his earlier publication, *The Design of Everyday Things*. While his partner Nielsen seldom celebrates the aesthetic value of design, Norman “has transformed his tone to be less critical and more balanced in terms of recognizing emotional factors in design” [97]. In his book, Norman argued that “attractive things work better” [80]. Norman introduced his studies of emotion with his colleagues Andrew Ortony and William Revelle, which suggested three levels of processing of the human brain: visceral level, behavioral level, and reflective level. Each level plays a different role and requires different design, as Norman called - three levels of design:

- Visceral design: it is all about initial reactions - appearance, touch, sound, and feel.

- Behavioral design: it is all about use - function, understandability, usability, and physical feel.
- Reflective design: it is all about message, culture, and the meaning of a product or its use. Reflective design is really about long-term experience [80].

The study of the role of fun, pleasure, beauty, aesthetics, affects or emotions in experience design has increased significantly in recent years. There are conferences, books, research and articles devoted to this new subject. But “this is still a nascent science,” and “there is no standard body of terminology, theory, or method” [81]. Norman admitted the difficulties in the study about emotional design in an interview early this year: “It is much easier to give rules for the design of usable products than for the design of pleasurable products... designing pleasurable, enjoyable products is hard. That’s why it is a wonderful challenge - and so much fun” [107].

### 3.2 Experience Design and Wayfinding

As mentioned above, the goal of experience design is to create a positive user experience, which is useful, usable and pleasurable. Everything a user encounters during the process, the environment, the products, the interface and many other elements such as sound and smell or taste, is crucial for creating positive user experience. It is inherently interdisciplinary, synthesizing methods, techniques, and wisdom from many previous fields.

As one of the pioneers in the field of experience design, AIGA organized a conference, *DUX2003* (Designing for User Experience), in San Francisco, California, in 2003. In the statement of the conference, it says:

“DUX2003 recognizes that design for user experience is a multi-faceted and multi-disciplinary undertaking that requires the participation of many disciplines and professionals in order to deeply understand who users are, what a quality user experience is and how to deliver and execute design that truly meets user needs and goals” [5].



DUX2003 also provided a list of identified disciplines, which included: animation, anthropology, branding, business analysis, cognitive psychology, content strategy and creation, ethnography, graphic design, industrial design, information architecture, information design, interaction design, marketing, organizational planning, product management, software engineering, usability, user interface design, venture capital, and visual design. DUX2003 declared that this is “not an exclusive list” [5]. And one of the disciplines that is missing from the list is wayfinding.

Miller defined wayfinding as a problem-solving process that will be affected by three factors: people factors, environmental factors, and information factors. She also pointed out that “wayfinding is a multi-sensory task” [72]. Wayfinding design involves landscape design, urban design, architecture design, interior design, industrial design, graphic design and more recently, interaction design. The multi-disciplinary nature and its connection to human cognition and emotion make wayfinding an integrated part of experience design. But the study of wayfinding has been isolated from the discussion of experience design, let alone the recent study of role of emotion in experience design.

There was a time that the environmental aspects and the information aspects of a wayfinding task were designed separately. Arthur and Passini as well as others called for integrated collaborations between architects and graphic designers. It is time to also take into account human emotions in wayfinding design. Knowledge from the study of experience design and emotional design can be adopted for wayfinding purpose and bring wayfinding to a new level - as what I call, positive wayfinding experience.

## CHAPTER 4. CREATING POSITIVE WAYFINDING EXPERIENCE

Wayfinding can be viewed as one of the earliest human activities due to the inherent mobility of humans. “Primitive man is normally deeply attached to the landscape that he lives in” [64] for the lack of means and knowledge for travelling. Most of the early wayfinding activities are tightly connected to homing behaviors. In archaic and classical Greek culture, wandering is “the result of an external force that drives body and mind away from their normal course... words related to wandering become metaphors for suffering” [73]. According to the Oxford English Dictionary, to travel means “to torment, distress; to suffer affliction; to labour, toil;” or “to make a journey; esp. to go on foot; to go from one place to another.” To move away from home or the familiar was always associated with negative meanings. But some Presocratics set off “for the sake of observation and discovery” [73]. The love of knowledge is the motive that drives them to travel extensively.

Wayfinding is a basic activity that people do throughout their entire lives whenever they move from one place to another: from bedroom to bathroom, home to work place, parking lot to entrance, entrance to elevator, elevator to one’s office, reaching to a copy machine, leaving the building, back to the parking lot, driving to a restaurant, back to home. Similar to the concepts of travel and wandering, wayfinding is always related to human emotions. For example, anyone who experiences disorientation and lack of recognition of the environment has experienced the uncertainty of being lost and feelings of frustration, anxiety, stress, fear or anger. “The phrase *losing one’s way* typically means that one does not know the directions and distances needed to get back to a starting point or other useful destination while one is under way” [89]. But the word *lost* “means much more than simple geographical uncertainty; it carries overtones of utter disaster” [64].

With the developments of transportation, people are travelling more extensively and more often, which increases the frequency and difficulty in wayfinding. Also, the built environment is becoming more and more complex in the modern world. For example, “airports become airport cities” [71] and buildings are expanded over years. The increasing mobility and complexity of our built environment make wayfinding much more challenging than ever. With “the complexity of today’s mammoth building projects” [36] and the fact that people are travelling much more often than before, the need to create effective, efficient wayfinding solutions is urgent.

Wayfinding designers work closely with other experts to solve wayfinding problems in a comprehensive way, but most of the time the emphasis is on the wayfinding task itself, not on the people. To define wayfinding as a *problem-solving* process indicates the emphasis on functional aspects over emotions. When emotions are concerned, most research and practice about wayfinding design to date focus mainly on negative emotions since they relate more to immediate problems and sometimes, safety issues. Positive emotions and their potentials in helping people find their way, however, are less explored.

Since the 1980s, positive emotion has gained increasing attention in the field of psychology. Positive emotions have been proved to lead to greater cognitive flexibility, facilitate creative problem-solving, and give rise to more thoughts and innovative solutions to problems [30] [59] [94] [93].

Recent research in the field of HCI also proves a tight connection between aesthetics and usability [103] [105] [63] [104]. As recent research shows that “aesthetically pleasing objects enable you to work better,” [80] a signage system with consideration of the context of the site and cultural implication can add to the experience of the site and at the same time, help people find their way with ease, pleasure and enjoyment.

## 4.1 Hypothesis

The goal of this thesis is to advocate the importance of positive emotions and their potentials in wayfinding. A positive wayfinding experience should be effective, efficient, as well as

pleasurable and enjoyable. A truly holistic approach to wayfinding should take into account four key elements: environment, information, service and emotion.

Examples are shown to indicate how each element works differently in a wayfinding system. A case study of wayfinding experience at IKEA, MN is analyzed to indicate how the four elements can be integrated to create a positive wayfinding experience.

## 4.2 Positive Emotions and Wayfinding

Feelings and emotions permeate people's daily lives [30]. Yet the importance of emotions, especially that of the positive ones was ill-explored. In order to clarify why positive emotions should be considered as an integrated part of wayfinding experience, research and studies on positive emotions from other disciplines - philosophy, psychology, product design and HCI are examined. Implication from the research is that positive emotions could play an important role in wayfinding. The extra dimension of emotion, both negative and positive ones, should be considered in the development of a positive wayfinding experience.

### 4.2.1 The Philosophy of Emotions

The scientific question by William James (1842-1910) in 1884: "What is an emotion?" has proved to be difficult to be resolved. Generally speaking, emotion is often regarded as the antithesis of reason.

Philosophers have become concerned about the nature of emotion since Socrates (470-399 BC) and the presocratics. Socrates argued that wisdom is superior to pleasure, and pleasures often occur together with false opinion [49]. Plato (427-347 BC) saw an intimate relationship between emotion and cognition. But he could not to make this relationship clear [49]. Aristotle (384-322 BC) later insisted on "the essential involvement of cognition in emotional response... He recognized cognition as the efficient cause and formulated a demonstrative account of emotional response" [49]. In the first chapter of *Rhetoric 2*, Aristotle gave a definition to emotion: "Emotions, which are accompanied by pain or pleasure, are things which so change men as to affect their judgements. Such as anger, pity, fear and the like, and the contraries of

these" [27].

In Roman times, the Stoics saw emotions as conjunction of ethics and that emotions were "judgements about the world and one's place in it" [96]. Throughout the Middle Ages, "the study of emotion was again typically attached to ethics" [96].

Rene Descartes (1596-1650), "the founder of modern philosophy" [17], defended in his book *On the Passions of the Soul* that emotions involved not only sensations caused by physical agitation, but also perceptions, desires, and beliefs as well, in another word, "emotions move from being merely bodily to becoming an essential ingredient in wisdom" [96]. Descartes ultimately tended to a value-oriented analysis of emotions. He argued that there were only six primitive passions - wonder, love, hatred, desire, joy and sadness, which were ingredients in the good life [39].

Benedictus de Spinoza (1632-1677) saw emotions as form of thoughts that, "for the most part, misunderstand the world and consequently make us miserable and frustrated" [96].

David Hume (1739-1888), "one of the most important figures in the Scottish Enlightenment" [10], challenged the inferior role of passion in philosophy and questioned the role of reason. He famously declared that "reason is, and ought to be, the slave of the passions" [96]. In addition to physiological and sensational aspects of emotion, Hume acknowledged what we now call the cognitive dimension of emotion.

Immanuel Kant (1724-1804) celebrated the importance of shared ('intersubjective') feeling in the appreciation of beauty and insisted that "nothing great is ever done without passion" [96]. Friedrich Wilhelm Nietzsche (1844-1900) saw passion as the watch word and reason as a source of suspicion.

In the 20th century, the study of emotions were given short shrift in North America and in England because of "the newly exaggerated emphasis on logic and science" while emotions "enjoy more attention" in Europe [96].

### 4.2.2 Positive Psychology

Emotion is important in personal and social life. It has been an important topic throughout the history of psychology. William James posed the scientific question “What is an emotion?” in 1884, still there is little agreement in the psychological community about the answer.

Before World War II, psychology had three distinct missions: “curing mental illness, making the lives of all people more productive and fulfilling, and identifying and nurturing high talent” [94]. Right after the war, the need for treatment of mental illness was urgent. “Psychology after World War II became a science largely devoted to healing” [93]. Emphasis of the study of psychology “shifted to assessing and curing individual suffering,” and there has been “an explosion in research on psychological disorders and the negative effects of environmental stressors” [94].

In the first issue in the 21st century, *The American Psychologist* had a special issue devoted to positive psychology. Dr. Seligman and Dr. Csikszentmihalyi gave an introduction to this special issue, in which they stated that the idea of positive psychology was not new, but the many distinguished ancestors “somehow failed to attract a cumulative, empirical body of research to ground their ideas” [94].

Negative emotions and experiences might be more urgent since they usually reflect “immediate problems or objective dangers” while “experiences that promote happiness often seem to pass without effort” [93]. As Seligman and Csikszentmihalyi said: “like the fish that is unaware of the water... people take for granted a certain amount of hope, love, enjoyment, and trust because these are the very conditions that allow them to go on living” [94]. This is probably the reason why negative emotions have long overridden positive emotions.

Due to the general negation, “positive affectivity was overlooked until the 1980s” [108]. Since then there is a growing body of research which indicates that even mild and positive emotions can “markedly influence everyday thought processes, and do so regularly” [59]. As Dr. Isen summarized in her 2000 paper *Positive Affect and Decision Making*: “the evidence indicates that, far from being an infrequent influence on thought processes, common positive feelings are fundamentally involved in cognitive organization and processing” [59]. Selected

findings about positive emotions are listed below:

- Positive affect promotes creativity in problem solving, as well as both efficiency and thoroughness in decision making, and other indicators of improves thinking.
- Positive affect promotes cognitive flexibility: People who are feeling happy become more able to make associations among ideas and see more different, multiple relations (similarities or differences) among stimuli than do people in a neutral feeling state.
- Positive affect tends to promote exploration and enjoyment of new ideas and possibilities, and new ways of looking at things - especially in enjoyable or safe situations.

Therefore, as Isen summarized, “under many circumstances the influence of mild positive feelings on thinking and decision making has been found to be not only substantial, but facilitative, leading to improved decision making and problem-solving” [59]. Positive affect leads to greater cognitive flexibility, facilitates creative problem-solving, gives rise to “more thoughts, more nontypical thoughts, and innovative solutions to problems” [30]. There are also evidences to show that positive affect can “promote attempts to cope with negative events or information... when the information is useful or important, positive affect facilitates careful processing of negative as well as positive information” [30]. More recent findings suggest that “when the task is at least either minimally interesting or important, positive affect promotes careful, thorough, open-minded, and systematic processing,” which can be induced readily, by small things in people’s lives [30].

In all, there are historical reasons for psychology’s focus on negative emotions. But psychology “is not just the study of disease, weakness, and damage; it also is the study of strength and virtue... Treatment is not just fixing what is wrong; it also is building what is right” [93]. As Seligman and Csikszentmihalyi said in the special issue about positive psychology: “psychologists will learn how to build the qualities that help individuals and communities, not just to enure and survive, but also to flourish” [94].

### 4.2.3 Positive Emotions in Product Design and HCI

William Morris (1834-1896), the pioneer of modern design, made the well-known statement in a lecture for the Birmingham Society of Arts and School of Design in 1880: “Have nothing in your house that you do not know to be useful or believe to be beautiful” [74]. For Morris, “the Aim of Art is to increase the happiness of men” [75]. Ever since then, the relationship between function and aesthetics has been an important topic of study throughout the history of product design.

Louis Sullivan (1856-1924) coined the expression “Form Follows Function” in 1896 while Adolf Loos (1870-1933) published the highly influential essay *Ornament und Verbrechen* (Ornament and Crime) in 1908. These two principles were effectively adopted in the late 1910s by the designers of the Bauhaus and applied to the design of everyday objects. As the single most important design institution of the 20th century, the Bauhaus had a great impact on the development of the Modern Movement.

Scandinavian designers, most notably Alvar Aalto, took up the concept of Modernism and incorporated a more humane approach by using natural materials and applying an organic sensibility that the Bauhaus aesthetic had put aside. In America, industrial designers such as Raymond Loewy (1893-1986), Norman bel Geddes (1893-1958) and Henry Dreyfuss challenged the extremely functional approach in design and created products that were visually appealing to the consumers. In the famous book published in 1955, *Designing for People*, Dreyfuss started the book with a statement: “if people are safe, more comfortable, more eager to purchase, more efficient - or just plain happier - by contact with the product, then the designer has succeeded,” and ended it with a quote from architect Daniel Burnham (1846-1912): “Let your watchword be order and your beacon beauty” [42].

The field of industrial design recognizes that the needs of people are more than function - emotion plays an important role. For example, “Form Follows Emotion” is the design philosophy of *frog design* (Figure 4.1), a global company that offers design services such as product design, digital design and brand & space. It was founded by Hartmut Esslinger, the German designer. “For Esslinger, no matter how elegant and functional a design is, it will not win a



place in our lives unless it can appeal at a deeper level, to touch our emotions" [100]. Esslinger said: "I wanted to make people smile. If you can make people smile and get them excited, they enjoy life better" [100].

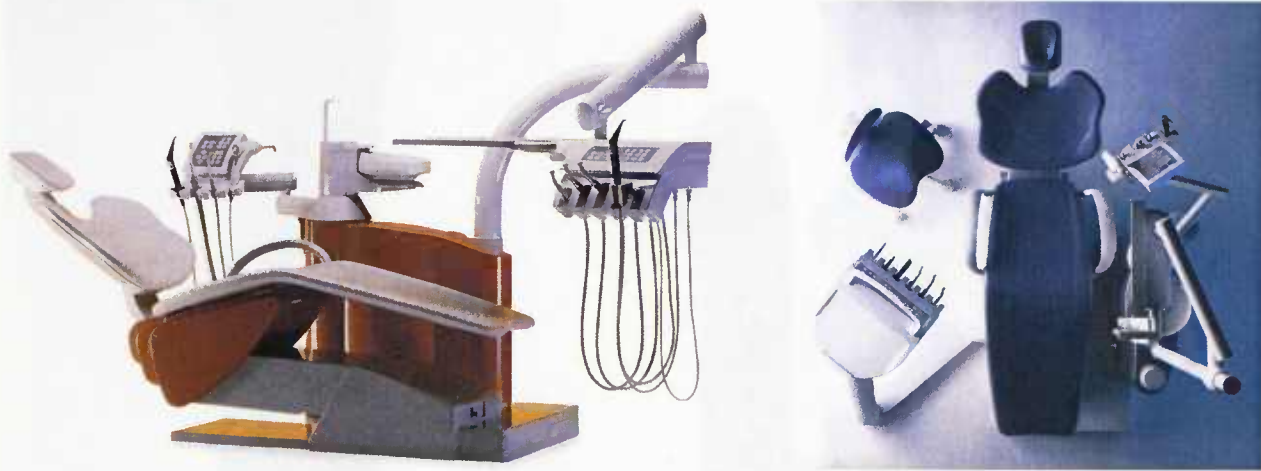


Figure 4.1 *Kavo Estetica 1063-65* dental unit, 1995, designed by *frog design*. "A balance of ergonomics and emotion, this all-in-one chair and instrument unit is conceived to alleviate the anxiety most patients feel when visiting the dentist" [100]. (Source: Fay Sweet, *Frog: Form Follows Emotion*, 1999)

Stefano Marzano, the Director of the Philips Design Group (Figure 4.2) once said: "We need to know what sorts of things people find pleasing to use, own and buy; what sorts of things arouse feelings of pleasure and pride and the sense of meaningful activity" [67]. Furthermore, products are not merely tools that people use to fulfill certain functions, they can "become friends of the user" - they have personality [67].

Another company that takes emotion into serious concern is Alessi, a Italian company famous for its playful designs (Figure 4.3 and 4.4). As Alberto Alessi, director of the firm, stated in the book *Alessi: Art and Poetry*: "We are looking for the 'toyful,' the more expressive, more complex, and more delightful" [99]. His design philosophy was deeply influenced by the work of psychoanalysts Franco Fornari (1921-1985) and D. W. Winnicott (1896-1971). Fornari's theory suggests that "our choices in life are predominantly ruled by emotion," while Winnicott identified the "need for toys and play to remind us of the happiness and security of childhood" in human existence [99]. Alberto Alessi declared that "modernism temporarily purged us of



Figure 4.2 *Ladyshave HP 6317-19*, Philips, 2005. (Source: web page at <http://www.design.philips.com/>, Philips)



Figure 4.3 Products designed by Michael Graves for Alessi. (Source: Charlotte Fiell and Peter Fiell, *Design of the 20th Century*, 1999)





Figure 4.4 *Juicy Salif* lemon squeezer, 1989. Designed by Philippe Starck for Alessi. "It's intriguing, tactile, and desirable, and even thought it squirts juice all over your shirt, it's fun to use" [99]. (Source: Fay Sweet, *Philippe Starck: subverchic design*, 1999)

these objects of enjoyment, but we are now ready for their return” [99].

With the advent of computer technology, interface design were introduced into various devices and the field of HCI emerged. The complexity of the tasks made designers realize that traditional ergonomics’ focus on physical relationships between people and the working system is not enough. In order to make things easier to learn, to use, and to remember, cognitive relationships between people and the system should be incorporated into the design process as well. Since the 1980s, usability became one of the most popular topics in the field of HCI. Effectiveness and efficiency of the system have been measured by items such as understanding, error rates, and the amount of time required to complete a task. In one of HCI’s most influential book, *The Design of Everyday Things*, Norman criticized that “the design community tend to put aesthetics first” and make things difficult to understand and use [79]. While emotion was often regarded as the antithesis of reason, aesthetics was often regarded as the antithesis of usability. HCI literature in general, and on usability in particular, mostly seems to neglect aesthetics, the deeper level of human needs, or the emotions.

Although the study of emotion has been a hot topic in the field of psychology and product design, it did not draw much attention in the field of HCI until 1990s.

Two Japanese researchers, Masaaki Kurosu and Kaori Kashimura conducted a test with 26 ATM layouts and found high relationships between the interface judgements of aesthetics and apparent usability (1995) [103]. The results was suspected by Israel scientist Noam Tractinsky, who claimed that the findings were “somewhat unexpected” [103]. He assumed the tests would have a different outcome in Israel since “the Japanese culture is known for its aesthetics tradition” while Israel culture is “better known for its action orientation” [103]. Tractinsky borrowed the same testing materials from the Japanese researchers and conducted the same test in Israel. He was surprised to find out that “even more than their Japanese counterparts, Israel perceived ease of use and design aesthetics to be closely related” (1997) [103]. Then in 2000, Tractinsky and his colleagues published a paper with a bold title: *What is beautiful is usable*, which is based on a testing with 132 third year Industrial Engineering students working on nine ATM layouts. This study once again demonstrated “the tight relationship between

users' initial perception of interface aesthetics and their perception of the system's usability. Moreover, these relationships endure even after actual use of the system" [105].

Recently, there is increasing research seek to study the aesthetics aspects of HCI and to "strike a balance between usability and aesthetics considerations" [63]. Apple iMac (Figure 4.5) was heralded as the "aesthetic revolution in computing" [87] in 1998 and recognized to be "one of the most important products at the end of the century" [68]. The tremendous success of Apple iMac is a great example showing how important it is to design something that is functional, as well as fun and easy to use. Its playful appeal with fruity colors was radically different from everything else out there at the time being. It is in sharp contrast to the boring design of other computers at that time with grey boxes. Most important of all, it is appealing to people on an emotional level.



Figure 4.5 Apple iMac, 1998. Designer by Apple Design Team and Jonathon Ive. Manufacturer: Apple Computers, Cupertino, California, USA. (Source: Catherine McDermott, *20th Century Design*, 2000)

The new wave of research on the visual aesthetics of computer interfaces suggests that "aesthetics is an important determinant of pleasure experienced by the user during the interaction" [104].

#### 4.2.4 Positive Emotions in Wayfinding

Wayfinding designers work closely with other experts to solve wayfinding problems in a much more comprehensive way than before, but most of the time the emphasis is on the wayfinding task, not the people. As mentioned in chapter two, wayfinding is “purposeful movement to a specific destination” [26]. It is a concept that involves interactions between attributes of the traveller and attributes of the environment. In her 1999 book, Miller pointed out that wayfinding is a problem-solving process that will be affected by three factors: people factors, environmental factors, and information factors [72]. The people factors that she was talking about concerned mostly about avoidance of physical or cognitive discomfort. Most research about wayfinding design up to date focuses on negative emotions such as stress, fear, anxiety and anger and how a better planned wayfinding design can help to avoid these negative emotions. Positive emotions, however, are mainly discussed within the practice of retail wayfinding, wayfinding for entertainment and wayfinding for children. Positive emotions such as pleasure, enjoyment and their potentials in wayfinding behavior are less explored.

Emotion has been a topic in philosophy for a long history while positive emotions did not gain enough attention in the field of psychology until 1980s. Although there are many different definitions of emotion, generally there are two common understandings of emotion: “(1) emotion is a reaction to events deemed relevant to the needs, goals, or concerns of an individual; and (2) emotion encompasses physiological, affective, behavioral, and cognitive components” [35]. As mentioned above, positive emotions have been proved to lead to greater cognitive flexibility, facilitate creative problem-solving, give rise to more thoughts and innovative solutions to problems.

The role of emotion and its impact on design has gained significant interest within design practice and design research over the last ten years, especially in the field of product design and HCI. The multi-disciplinary nature and its connection to human cognition and emotion make wayfinding an integrated part of experience design. But the study of wayfinding has been isolated from the discussion of experience design, let alone the recent study of role of emotions in experience design.

As psychologist Seligman said: "Psychology is not just the study of disease, weakness, and damage; it also is the study of strength and virtue... Treatment is not just fixing what is wrong; it also is building what is right" [93]. So does wayfinding. Wayfinding experience should be not only a study and practice focusing merely on problem-solving, but also a study and practice of creating pleasurable and enjoyable experiences for the people. Many psychologists have argued that "it is impossible for a person to have a thought or perform an action without engaging, at least unconsciously, his or her emotional systems" [35]. We can no longer ignore the important role that emotion plays in design and people's everyday life. By incorporating the extra dimension of emotion, not only negative ones but also positive ones, wayfinding experience can be far more richer than its predecessors.

It is important to reiterate that the purpose of this thesis is not to suggest the predominance of emotional or aesthetic considerations over others. Emotion is only part of the positive wayfinding experience, the integrated process allows us to look at environment, information, service and emotion as a whole. The goal of this thesis is to advocate better balance of major design dimensions in wayfinding. Creating positive wayfinding experience uses a holistic approach by incorporating the extra dimension of emotion, so that people will have pleasure or enjoyment in the wayfinding experience.

### 4.3 What is Positive Wayfinding Experience?

To define wayfinding as a problem-solving process implies that such an approach is limited as it tends to focus merely on the functional aspects of the solution: Is it effective? Is it efficient? Is it accessible to the users? Or to be more precise, the focus is mainly on a user's physical and cognitive attributes. A positive wayfinding experience is an approach that moves beyond problem-solving approaches to design, which encourages a holistic view of people, evaluating the quality of design on the basis of a wider relationship between a wayfinding experience and the people. A positive wayfinding experience is not only about the designing of the environment or the information system, but also about creating wayfinding experiences based on different levels of user needs. It is an approach that looks into not only the physical



and cognitive attributes of the people, but also a deeper level, the emotions. Experience design becomes meaningful only in relation to users, physically, cognitively and emotionally. A positive wayfinding experience comes from a holistic understanding of people, their needs for being able to find their way around and their needs for aesthetics, fun and intelligence.

In short, a positive wayfinding experience is a wayfinding solution that is effective, efficient, pleasurable and enjoyable. Effectiveness and efficiency are two criteria that have been elaborately discussed over years while pleasure and enjoyment are less explored concepts in the field of wayfinding.

#### **4.3.1 Effectiveness**

Effectiveness is the most fundamental criteria of a positive wayfinding experience. An effective wayfinding solution is one that is useful and provides sufficient information. It is about what information is needed, when it is needed and where it is expected, in another word, it is about the content, locations, plans and management of wayfinding information.

#### **4.3.2 Efficiency**

Efficiency is about helping people to find their way with ease. An efficient wayfinding solution is one that is usable. It is about legibility, readability or accessibility. Providing people with sufficient information is not enough when people need to reach a destination within a limited time frame. Typeface, size of the types, line spacing, contrast of the types and the background as well as many other elements should be designed carefully so that people can find their way with ease and speed.

Efficiency is a key criteria for success in wayfinding by car. Wayfinding with speed and pressure requires a wayfinding system that is highly efficient so that people would have enough time for reaction. With a consistent highway landscape and comprehensive information system, the US highway is effective in most cases. But problems remain. For example, on some highways, especially those across cities, sign clutter and chaos is not uncommon (Figure 4.6). Also research showed that by 2005, there will be 36 million people or about one-fifth of the



U.S. driving population age 65 and older [7]. Problems caused by aging include reduced contrast sensitivity, slower reactions to changing conditions. Legibility and recognition of the current highway signs are questioned. In order to increase the legibility and improve ease of recognition of road sign legends while reducing the effects of halation for older drivers and drivers with reduced contrast sensitivity when letters are displayed on high brightness retroreflective materials, a new typeface, *Clearview* was designed and has become a federally approved alternative to Standard Alphabets for Traffic Control Devices since September 2, 2004.



Figure 4.6 Highway Signage.

The new typeface (Figure 4.7) was designed and tested through a partnership of typeface designers, perceptual psychologists, human factors scientists and highway engineers. A typeface, *Clearview*, is designed for mixed case applications with initial capital letter. Reading mixed case is easier than reading all uppercase words because “each word becomes a unique shape instead of an assembly of straight and curved lines with a constant top and bottom line” [9]. Research (Figure 4.8, left) has shown that on a road with a posted speed limit of 45 mph, a driver is travelling at 66 feet per second. With *Clearview-Bold*, the desired destination legend is recognized 1.3 seconds earlier (84 feet) and with greater accuracy, giving the driver significantly more time to react to the information displayed [7]. Other research (Figure 4.8) revealed that when the mixed case *Clearview-Condensed* (upper position) is compared to the



Figure 4.7 Clearview in use. (Source: web page at <http://mutcd.fhwa.dot.gov/HTM/clearfont/cf-english.htm> Manual on Uniform Traffic Control Devices)

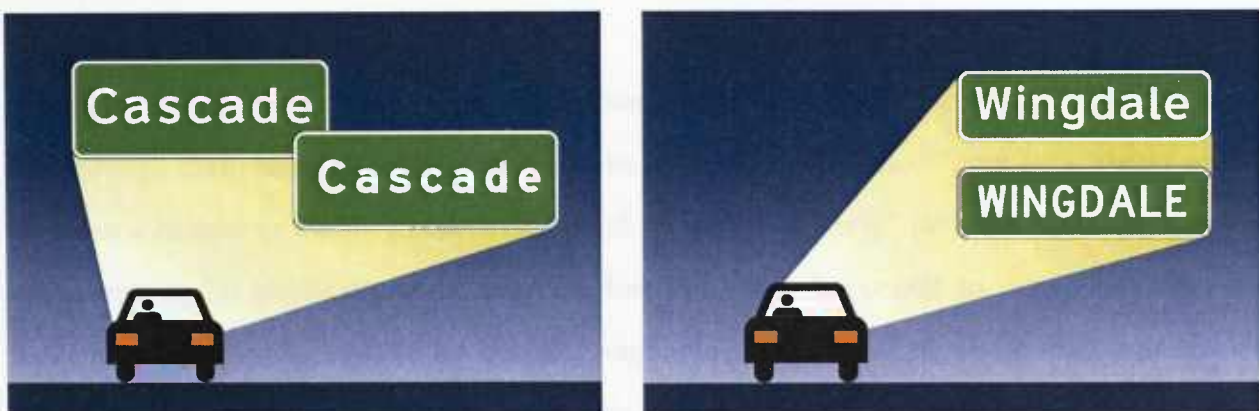


Figure 4.8 Left: Clearview-Bold (left) vs FHWA Standard Alphabets Series E-modified (right). Right: Clearview-Condensed (upper) vs FHWA Standard Alphabets Series D (lower) (Source: web page at <http://mutcd.fhwa.dot.gov/HTM/clearfont/cf-english.htm> Manual on Uniform Traffic Control Devices)

most commonly used all-capital-letter typeface (FHWA Series D, lower position), there was a 14 percent increase in recognition distance when viewed by older drivers at night, with no loss of legibility. When the size of Clearview-Condensed was increased by 12 percent to equal the overall footprint of the uppercase display, the recognition gain doubled to 29 percent with little change in overall sign size [7].

This project is one of the few wayfinding projects that conducted usability testing, a method widely used in the field of HCI and product design to ensure the effectiveness and efficiency of a design. Results from the testing prove the "often-asserted but seldom-proved concepts such as whether mixed-case faces are really easier to read" [48]. With the tested new typeface put into use, highway wayfinding will be much more efficient than before.

### 4.3.3 Pleasure

Dr. Seligman defines the word pleasure as "the good feeling that comes from satisfying homeostatic needs such as hunger, sex, and bodily comfort" [94]. Or as the Oxford English Dictionary states, pleasure is the opposite of pain; sensual gratification, satisfaction, approval. "Pleasure depends heavily on bodily stimulation" [50]. In the context of wayfinding, being pleasure from a wayfinding experience means being pleased from various senses: sight, hearing, touch, or smell, which is stimulated from the interaction with the environment, the information, or interpersonal communication.

"Hospital often have labyrinthine circulation systems and confusing signage" [38]. Traveling through them to reach a destination can be exhausted, frustrated "even for a hearty soul, let alone a patient or family member distressed by illness or worry" [66]. Sometimes, patients would even suffer physically when they are lost [37]. It is important to design an effective and efficient wayfinding system for hospital wayfinding. But a positive wayfinding experience should be more than a merely functional one. As designer Sue Gould said: hospitals are becoming medical shopping centers... they want to be welcoming to people [40].

A new wayfinding was designed for the Pediatric Clinics at the University of California San Francisco (UCSF) Medical Center. Environment and signs were designed not only to point



directions, but also to work as “art and decorative elements” [40]. Colorful walls as well as images from nature, signs and other elements were designed in an integrated way to create a friendly, welcoming and pleasurable experience for the people (Figure 4.9).



Figure 4.9 Pediatric Clinics at the University of California San Francisco (UCSF) Medical Center.

#### 4.3.4 Enjoyment

Dr. Seligman defines the word enjoyment as “the good feelings people experience when they break through the limits of homeostasis - when they do something that stretches them beyond what they were - in an athletic event, an artistic performance, a good deed, a stimulating conversation” [94]. Enjoyment pertains to people’s values. In the context of wayfinding, enjoyment is cultivated from something more than finding one’s way. Enjoyment in wayfinding would relate to, for example, an interesting environment, the aesthetics of an identification sign, fun, surprise or knowledge gained through the wayfinding experience.

A historic center in Lyon, France became a UNESCO World Heritage Site in 1999. The Integral Ruedi Baur & Associates Agency was asked to design a signage system to indicate the sights of the historic center. “Going beyond the classic answer to the question of wayfinding, these panels encourage users to actively explore the sites” [32]. There is a black-and-white photograph of an architectural detail found nearby on each sign (Figure 4.10) to “encourage

users to take notice of, for example, the ox figure at the top of a facade, a statue of Guignol, or a low relief" [32]. A wayfinding experience thus becomes more than finding one's way to a destination. By reading the signage, people are able to not only find their way around, but also learn more about the historic center. It is an enjoyable wayfinding experience that can help people learn more.



Figure 4.10 Tourist Signage for Vieux-Lyon, France, designed by Integral Ruedi Baur & Associates Agency, 1999-2001. (Source: Ruedi Baur, *Ruedi Baur..., Integral..., and Partners*, 2001)

Effectiveness and efficiency are functional aspects of a positive wayfinding experience while

pleasure and enjoyment relates more to positive emotions. Effectiveness and efficiency are fundamental for a positive wayfinding experience. Most of the time, the experience of getting lost is unpleasant and irritating. Pleasure and enjoyment cannot be experienced without an effective and efficient wayfinding solution. Being late for an important interview because of the failure to find the right office or missing a flight can be very annoying. Effectiveness and efficiency help to avoid negative emotions in the process of wayfinding. But effectiveness and efficiency alone are not enough to induce pleasure and enjoyment.

In all, a positive wayfinding experience is one from which people will be able to:

- find their way easily and comfortably;
- be delighted by the visually attractive design or from other senses: hearing, touch and smell;
- receive information and help from friendly interpersonal communication; or
- get more out of the experience: surprise, fun, humor, knowledge, empowerment, etc.

#### **4.4 Elements of Positive Wayfinding Experience**

Generally speaking, four major elements should be taken into account when developing a positive wayfinding experience: environment, information, service, and emotion.

##### **4.4.1 Environment**

Environmental design is fundamental for wayfinding success. If the environment failed to provide a clear cognitive map, even the most effective signage system cannot remedy that shortcoming, especially in a complex environment. Cognitive maps can be created by reinforcement of environmental features such as entrances and exits, circulation paths, districts, nodes (or transition points), vertical circulations (stairs, elevators), and landmarks, so that people know where they are and how to find their way.

A small and straightforward building plan might be easy for navigation. But it does not necessary mean that a complex building will be impossible for successful wayfinding. Creating

a built environment with reinforced cognitive map does not necessarily mean a oversimplified, dull building. As Passini said: "After all, interest and curiosity lead to heightened understanding and easy learning: boredom does not" [84]. A giant site can be broken down into smaller sections to bring a human scale to it. Variations in lighting, texture, materials, colors, aroma, and acoustical for different sections can also help navigation.

Putnam Investments is a company with over \$306 billion assets under management. Sasaki Association and Elkus/Manfredi were called in to turn a former DEC manufacturing building into a one-floor corporate office of over 300,000 sq. ft. in Andover, Mass. (Figure 4.11). The challenge was to bring a human scale to the mammoth office by breaking the space, and "create a user friendly wayfinding and identification system" [88]. The designers took the New England vernacular and broke the facility into villages and neighborhoods. Ken Daly, the managing director explained: "People live in neighborhoods and each building is a village" [88]. There is a village center inside each village with large skylights (Figure 4.11, middle). It is easily identified and functions as a place where employees have access to share essentials. Each village has its own defined colors and fabrics to make each space different than the others. It gives identity to each space and at the same time, offers environmental clues for wayfinding. A main "street" runs through all the villages with a signage system pointing directions and showing people where they are (Figure 4.11, right). Also, walls at the end of each building overlook six different gardens.

By breaking down the site into smaller spaces (districts), each one with an identified center (nodes), and using gardens, color themes, fabrics to differentiate each space, a mammoth space becomes user friendly with a human scale. Different treatment of each space gives them identities and becomes wayfinding clue. The center inside each space with sky light not only brings the outdoor inside, but also becomes a node where there are directional signs to facilitate wayfinding. Thus a working environment becomes friendly, interesting, and easy to navigate.

Using different color themes to differentiate parts of an environment is an effective way to facilitate wayfinding. The Children's Leisure Center in Espoo, Finland is divided into three teaching areas, each of which has its own specific color: yellow, blue and red, both inside and



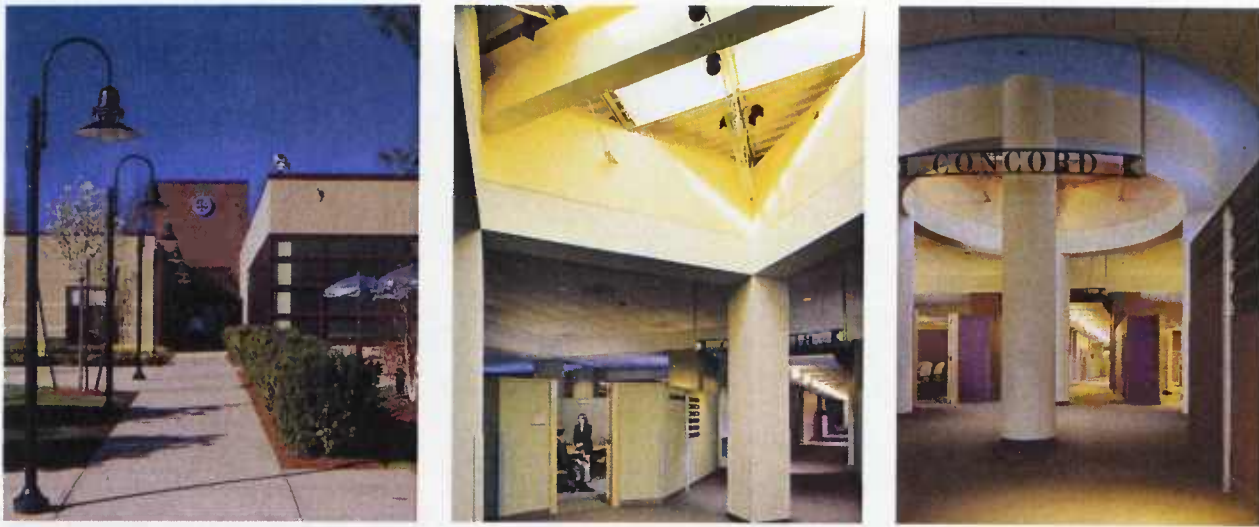


Figure 4.11 Putnam Investments, Andover, Mass. Left: Outdoor. Middle: village center with large skylights. Right: village center with signs on the wall and hanging from the ceiling.

out [106] (Figure 4.12 and 4.13). Signage system can be simplified with an environment like this. People can find their destination by looking at the colors, not lots of signs with little arrows. In the 1980s and 1990s, a lot of interiors were “so homogeneous that we had to rely on signs,” said Jeffry Corbin, principal of *Corbin*, an environmental design firm: “people would rather deal with the destinations themselves than with little arrows pointing them in the right direction” [76]. A bettered planned environment not only makes wayfinding easier, but also makes it a more interesting place to explore.

Another way in helping people navigate through a complex environment without depending heavily on signs is to provide a clear route that people can follow easily. The Elder Beerman Department Store in Warsaw is a site with 55,000 sq. ft. footprint. As Fidel Miro, design and planning director for *Horst Design Group* said this store is “really just a large box” [24]. Essentially, designers created a circle in a box. Using lines on the ceiling as well as patterns on the floor, designers created a circulation path that is easy to follow without looking out for signs (Figure 4.14). The easily navigated floor plan encourages shoppers to shop around and freely browser each section.





Figure 4.12 Children's Leisure Center, Espoo, Finland



Figure 4.13 Children's Leisure Center, Espoo, Finland

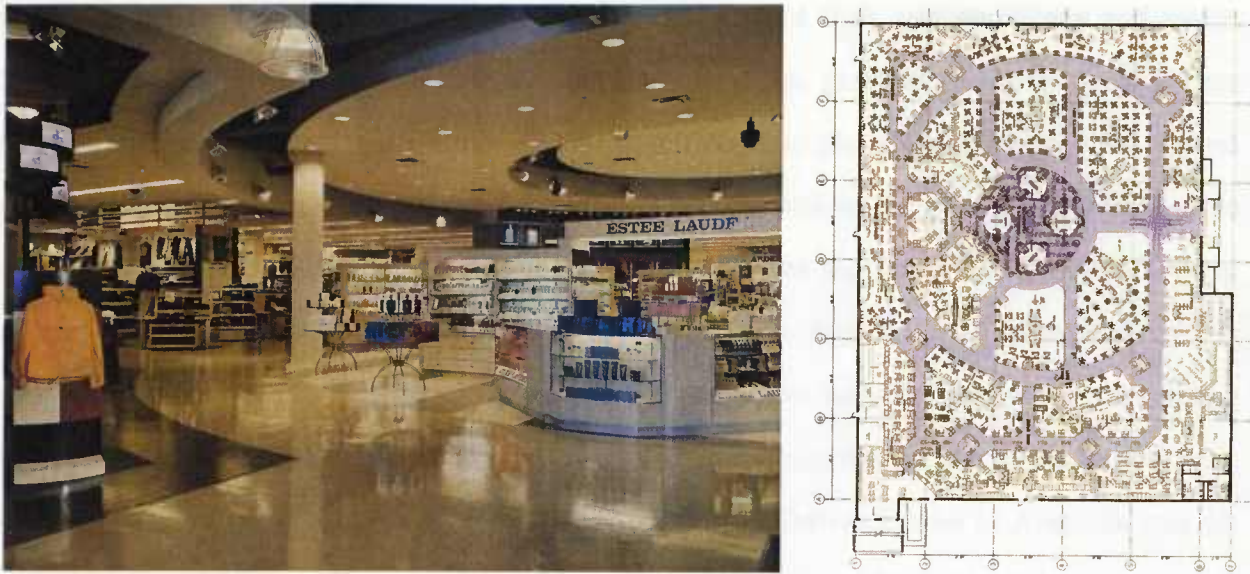


Figure 4.14 The Elder Beerman Department Store, Warsaw

#### 4.4.2 Information

Cognitive map refers to “the internal spatial representation of environmental information” [52]. It is not directly observable. In a simple environment, cognitive map alone might be enough for people to find their way. With a complex environment, the internal spatial representation of environmental information that people have in their mind is not enough for wayfinding purpose. Information design, such as graphic information with signs, maps and information booths should be introduced to give people external information.

Information design in wayfinding was thought to be simply signs. Yet there should be more. An information design should be well planned based on human needs. It will not be successful without the understanding of what information people need, when and where they need it, and how they need it. As Passini said: “A key rule of environmental perception is that information is not seen because it is there but because it is needed” [85]. Also an effective information system should be consistent. A comprehensive information design for wayfinding purpose might include: naming system; pre-visit information such as a web site, or a printed handout; on site information such as maps, directories, directional signs, identification signs, safety signs, etc.

When some clients hired wayfinding consultants to solve wayfinding problem, they wanted

the problem solved in a way that would allow people to find their way seamlessly and easily. But most of the times, they are not interested in aesthetics, graphics or design [41]. Recent findings suggest that aesthetics is an important determinant of pleasure experience [104]. “First aesthetics impressions are affective and are formed immediately at a low level and thus precede cognitive processes. Hence, the immediate affective reactions may color and potentially sway successive cognitive process” [104]. Therefore, information design for a positive wayfinding experience should be functional and aesthetically appealing as well. An aesthetically appealing information system can induce positive emotions and ultimately, benefit the wayfinding process.

The award-winning sign program of the Melbourne Exhibition Center in Australia was designed by Emery Vincent Design (Figure 4.15). The colorful signs blended into the environment and became part of the environment identity. The giant signs, especially identification signs jut through the walls and ceiling, nicely integrated with the building and add to the experience of the space. The architecture context is enhanced by the “sophisticated typography” [43]. As a juror of the 1996 SEG D competition commented: “Without the graphics, there isn’t much left” [43]. This is a great example to show how information design of a wayfinding system can be tightly integrated with the environmental design to create an unexpected wayfinding experience. The uncommonly large size of these identification signs help people find their way from a great distance and ensure people where they are when they reach the destination, at the same time, the signs became an integrated part of the architecture and create a environment that is interesting, exciting, and fun to explore.

Other senses such as hearing, touch and smell can be incorporated into the visually-dominant information design, which will be especially helpful for the visually impaired. Aeroports de Paris-France contacted Coco Raynes to create a universally accessible wayfinding and information system for Roissy Charles de Gaulle Airport. The design of the *Raynes Rail* won the prestigious Gold Award from the Industrial Designers Society of America (IDSA), the Honor Award from SEG D, and the Design Excellence / Innovation Award from I.D. Magazine. As the SEG D Juror Holly Hampton observes: “This project elevates accessibility through wayfinding to a new level - touching upon the senses, without obstacles to the end, creating a





Figure 4.15 Sign Program for Melbourne Exhibition Center, Australia, designed by Emery Vincent Design, 1996. (Source: Gail Diebler Finke, *You Are Here: Graphics that Direct, Explain & Entertain*, 1999)

truly barrier-free environment” [69]. A tactile map, floor markers, and handrails installed with Braille and audio information guides people from a sidewalk drop-off area outside Terminal 2C to a reception point inside the terminal (Figure 4.16). Braille messages are inscribed on the inner face of the handrails while audio messages (in French, Spanish, and English) are activated by motion sensors. This is one of the few wayfinding solutions that created a complete wayfinding system for the visually impaired, not just Braille on identification signs, and incorporated touch and sound for wayfinding purpose. It certainly helps to improve the wayfinding experience for the visually impaired so that wayfinding can be easier and more pleasurable for them.



Figure 4.16 Charles de Gaulle Airport, Paris. Designed by Coco Raynes Associates, Inc., Boston, MA.

More recently, information with a form of touch screen has been introduced to facilitate



wayfinding, so does GPS. In the near future, there will be more wayfinding information presented digitally and people can get information from a kiosk, a wireless device or other forms other than traditional maps and signs.

The i-Site Information System installed in Johns Hopkins University's Homewood Campus is one of the early attempts in creating interactive digital communication for wayfinding purpose (Figure 4.17). Sixteen i-Site kiosks were installed on the 128-acre campus to help people find their way. There is a static map, an LCD monitor, five buttons, a hidden microphone and speaker on the kiosk. Usability testings of the prototype were conducted by environmental psychologist Dr. Peter Hecht to determine what information should be included and where the kiosks should be located [53]. All people need to do is to touch the screen for information they want. They can also push the *Help Desk* button to activate a hands-free telephone that dials out to live assistance by calling the security office. Even if the power is disrupted, people can always refer to the static map to find their way. As one of the jurors who awarded the SEGD Design Award to the project stated: "The kiosk demonstrates the power of interactive digital communications media to tailor wayfinding to the individual needs of a diverse range of users" [53].



Figure 4.17 i-Site Information System at Johns Hopkins University's Homewood Campus.

#### 4.4.3 Service

In many cases, wayfinding solutions focus mainly on environmental design and information design. Yet an important element - service is missing.

Norman's theory about three levels of emotional design includes: visceral design, behavioral design and reflective design. "Reflective design is really about long-term customer experience. It is about service, about providing a personal touch and a warm interaction" [80]. Interpersonal communication is a fundamental need for human. When people get lost, they tend to ask for help, especially help from staff in a public building. But staff without training will have different terminologies for a same place and describe direction in various ways. For instance, radiology and X-ray will be used in a hospital by different staff to indicate the same place and cause confusions in patients and visitors. Therefore, it's important to educate staff in a public building to speak the same language (terminology, etc.) as that on the information design system and furnish people with complete and accurate wayfinding instructions.

Other services for wayfinding purpose may include providing pre-visit information to people, providing people with personalized wayfinding information on site, and providing information that adds to the experience.

A wayfinding system was designed for the Massachusetts General Hospital (MGH), a complex with 18 public hospital buildings (Figure 4.18). As described in the report created by Two Twelve Associates, one of the goals for the project is to implement MGH's commitment to a "patients, families and visitors first" philosophy [31]. In a complex site as MGH, patients or visitors will easily walk into a new building without knowing it since many of them are connected on the ground floor. To be able to reach the final destination, they need to find a right elevator on the ground floor first.

The new wayfinding system is based on routes and stops like a subway system (Figure 4.19). First of all, the complex site is broken down into five sections. Each section is color coded. Then major corridors are named and reinforced as major "routes" while lobbies work as nodes and elevator work as "stops." Elevators are named with letters (not including the letter *i*). A clear signage system with symbols and letters will guide English speakers as well as non

English speakers to their destination (Figure 4.20). The universal naming system helps people find their way much easier than before.

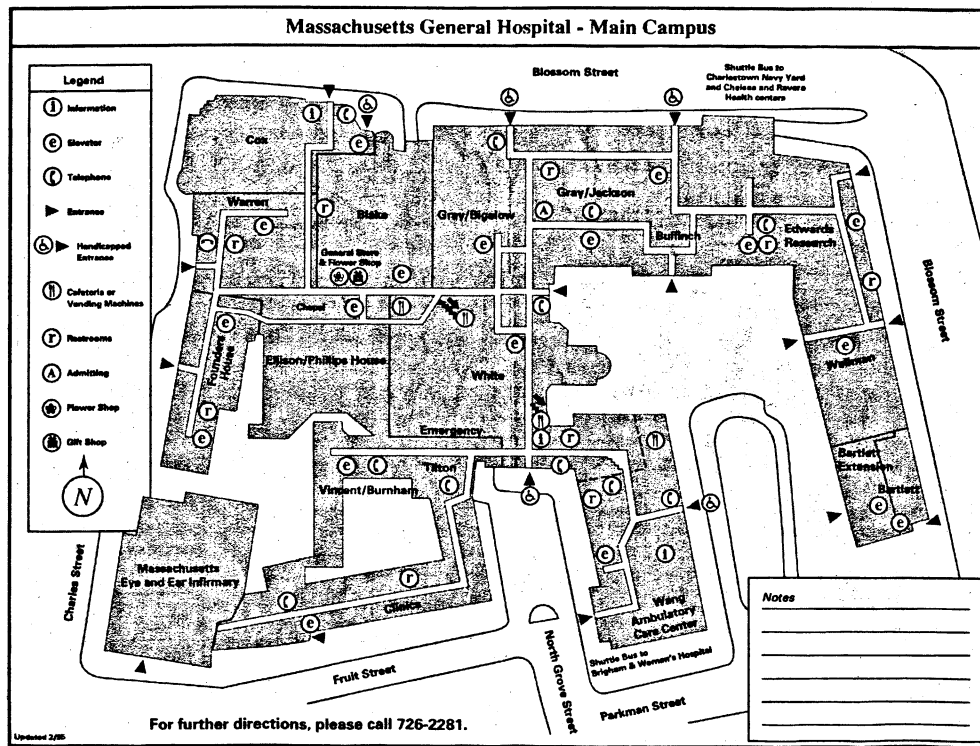


Figure 4.18 Original Map of Massachusetts General Hospital. (Source: image provided by Cindy Poulton, designer of the wayfinding system for MGH)

Furthermore, staff will be educated with the naming system and terminologies used on the information system. They will learn the labels for the elevators, corridors and give visitors and patients accurate information and directions. People can find directions, maps, and parking information from their web site before they go. When they arrive at the hospital, patients and visitors can ask for building directions telling them how to go from where they are to their destination (Figure 4.21). This service provide them with much more personalize information and help them find their way much easier.

Service is about long-term customer experience. Good service can build up a person's loyalty to the institute. Every year, there are about 429 million visitors in over 390 national parks. A person visiting one national park will probably visit more in the future. A good service that helps to make the trip pleasurable and enjoyable is a key element for attract-



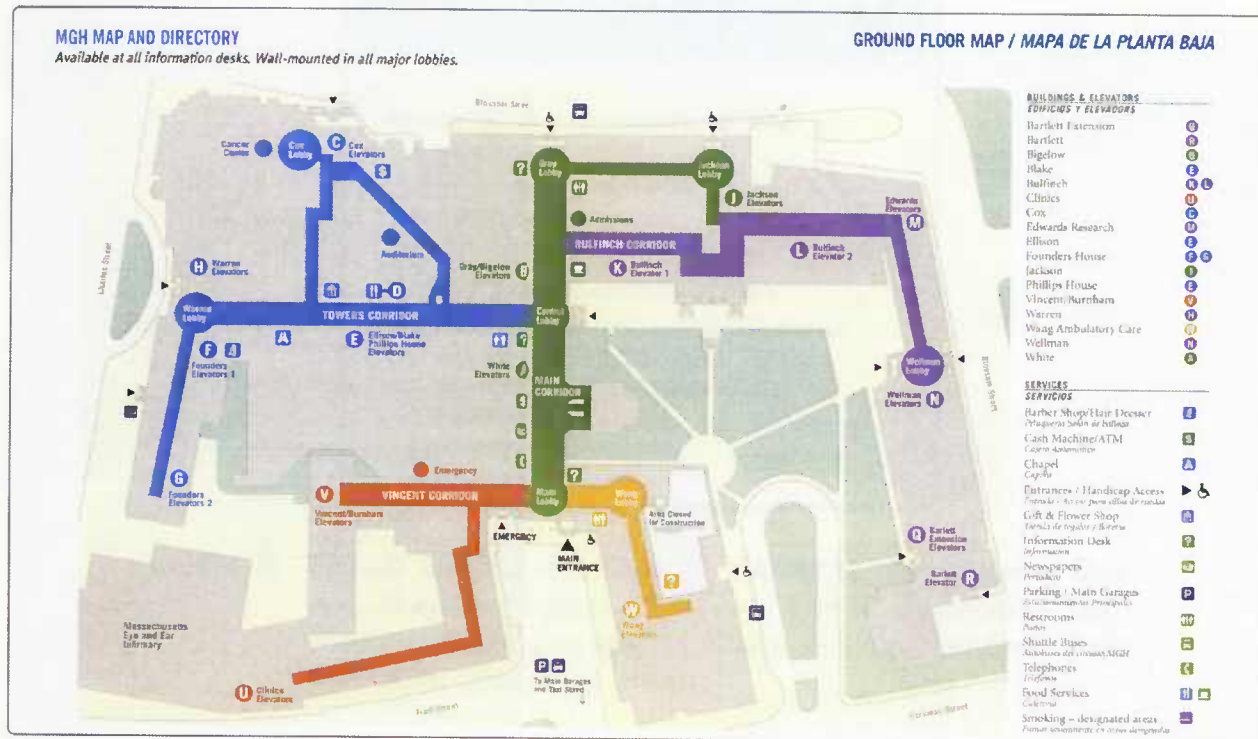


Figure 4.19 Ground Floor Map of Massachusetts General Hospital, designed by Two Twelve Associates, 1997. (Source: image provided by Cindy Poulton, designer of the wayfinding system for MGH)



Figure 4.20 Signage System for Massachusetts General Hospital, designed by Two Twelve Associates, 1997. (Source: Gail Diebler Finke, *You Are Here: Graphics that Direct, Explain & Entertain*, 1999)

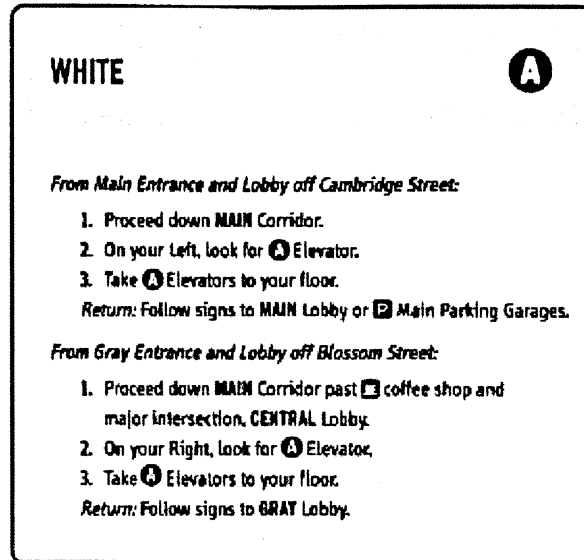


Figure 4.21 Sample building directions for visitors of Massachusetts General Hospital, designed by Two Twelve Associates, 1997. (Source: image provided by Cindy Poulton, designer of the wayfinding system for MGH)

ing returning visitors. The services offer by the National Park Service (NPS) are consistent and extensive. Before people go, they can visit the web site of the National Park Service (<http://www.nps.gov/>) and get information to plan their trips: attractions, maps & orientation, camping, lodging, dining, gas stations, activities... When they arrive at the site, an entrance with the name of the park, the arrowhead symbol of the NPS on some natural material - woods, stones, will be there ensuring the arrival. Rangers at the entrance will offer visitors maps and handouts with related information. Each map is designed consistent with any other maps of the NPS. Once you learn how to read one map, it'll be easy to read the others since they are based on the same guidelines (Figure 4.22 and 4.23).

The current signage standards used by the NPS were adopted in 1978, which focused primarily on vehicular traffic [54]. The NPS UniGuide Program: identity, wayfinding and visitor information for the National Park Service (Figure 4.24), has been developed since 2003 and won the 2003 SEG D Honor Award. Comment from the Jury stated that:

“Hooray for the National Park Service! Finally, an understanding of what the user needs to create signage and wayside exhibits. This manual will assure complete



Figure 4.22 Maps from National Parks (Source: author's collection)

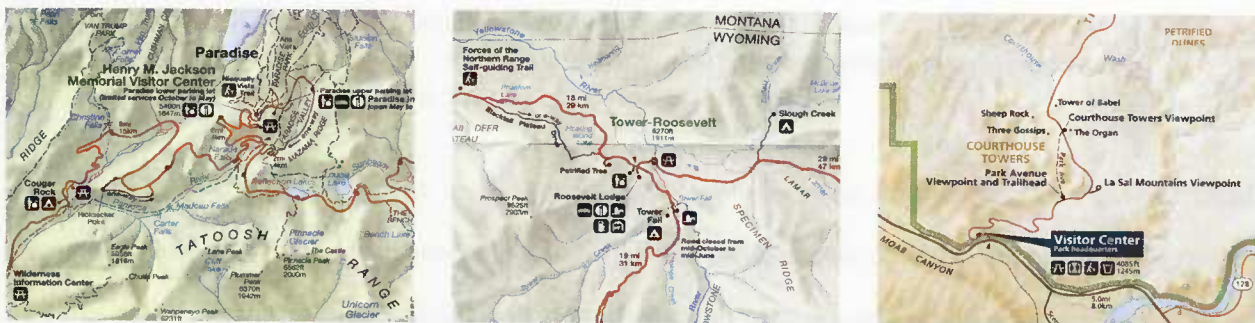


Figure 4.23 Partial maps from National Parks: Left - Mount Rainier; Middle - Yellow Stone; Right - Arches. (Source: author's collection)



continuity in all forms of communication at the parks. Clearly great work went into testing and evaluation of color, typography, and materials. The end user was at the forefront of this project, and visitors will come to appreciate all the thoughtful work in this study” [12].

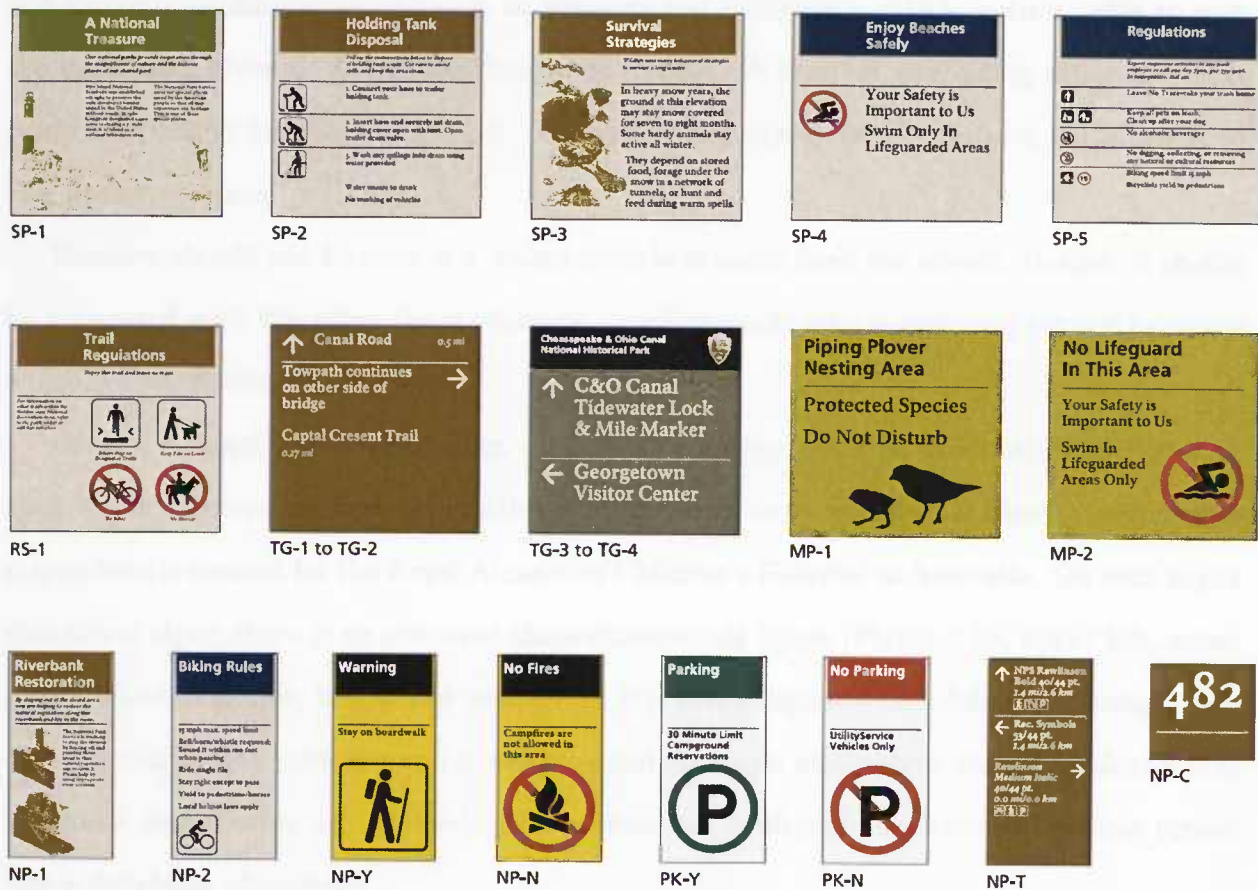


Figure 4.24 Signs from the UniGuide Standards Manual. (Source: web page at <http://www.nps.gov/hfc/acquisition/uniguide.htm>, UniGuide Standards Manual)

Other than the environment and information design, service of the NPS is an important element for wayfinding experience in the national parks. Rangers in uniforms are always ready to help: pointing directions, offering latest information, introducing knowledge about the site, leading a hike, etc. Visitors can find their way by following the maps, the signs, by asking rangers or other people in the park. Information from the rangers, for example, the history of the Yellowstone National Parks, will add more to the experience. It is not only about safety and efficiency, but also about exploration and gaining knowledge.

#### 4.4.4 Emotion

Emotion, especially positive emotion is the least explored subject for wayfinding. “Emotion is a system for the realization of an individual’s concerns” [101]. A positive wayfinding experience will avoid negative emotions such as frustration, anxiety, stress, fear and anger, and cultivate positive emotions such as pleasure and enjoyment, which in turn helps to ease the wayfinding process. Attractive things work better. A positive wayfinding experience that cultivates positive emotions is not only pleasurable and enjoyable, but in turn, helps people to find their way easier.

Emotion should not be seen as a design criteria isolated from the others. Rather, it should be integrated with the other three elements - environment, information and service to create a positive wayfinding experience.

Usually a hospital is a frightening, or at least unhappy place for most children. Yet with a wayfinding system focusing on emotional needs of its user - children, a friendly and playful atmosphere is created for the Royal Alexandra Children’s Hospital in Australia. On each major directional signs, there is an oversized three-dimensional figure (Figure 4.25, upper left, upper right), which is simple, bright and colorful, as if it just jumps out of children’s drawings. The cheerful images give visitors a warm welcome and create an atmosphere that is so playful that the stress and anxiety are released. The professional healthcare environment is thus turned into a delightful playground.

Other directional signs that are mounted to the wall maintain the playfulness with colored circles, faux shadows, and colored tilted squares (Figure 4.25, bottom right). On each of the identification signs, there is a colorful animal - simple, bright, and playful (Figure 4.25, bottom left). Return patients can use the image of the animal as wayfinding clue instead of the medical term. ADA type regulations relating to disabilities and accessibility was not yet introduced to Australia before the project was finished. Size of the types are not big enough for people with low vision. Still the project got an Merit award from the 1996 SEGD competition since the designers “instilled a sense of play into a healthcare environment with delightful sculptured characters and bright colors” - it is distinguished by its “joy and soulfulness” [43].



Figure 4.25 Sign Program for Royal Alexandra Children's Hospital, designed by Emery Vincent Design, 1996. (Source: Gail Diebler Finke, *You Are Here: Graphics that Direct, Explain & Entertain*, 1999)

Another wayfinding system that is beyond pointing directions and take visitors' emotional response into account is the signage system for Minnesota Children's Museum designed. As the design firm *Pentagram Design* stated, the signage system was designed to reflect the museum's dedication to "hands-on" activities for kids [16]. The image of a hand is used on walls as murals, at the entrance as a sculpture, and on colorful signs to show wayfinding information (Figure 4.26). The playfulness of the signs thus becomes the source of fun and joyfulness for visitors during the wayfinding process.

#### 4.5 Case Studies: IKEA

IKEA is a home furnishing company started from Sweden and became global. To give the many people "a better everyday life" [14] is the vision of IKEA, which can be reflected from their low price furnishings with good design and function, and also from their user-friendly approach in wayfinding. IKEA stores are generally the same all around the world with exceptions of language and product localization: layout with predetermined traffic patterns, consistent signage systems and service. A customer was able to decorate his room in Taipei much as it was when he was living in Nova Scotia, Canada. He was surprised to find that the store in Taipei is almost the same as the store in Yorkville Ontario [65]. Familiarity makes the shopping at any of the IKEA store as easy as the others.

Wayfinding experience at IKEA, Bloomington, MN will be analyzed here in detail to reveal how the environment, information, service can be integrated with considerations of human emotions to create a positive wayfinding experience.

There are two floors: the first level is *Marketplace* and the second is *Showroom*. *Showroom* is the place that all items are arranged in context, for example, desks, work chairs and workplace storages as well as desk accessories, table lamps are presented in the section of *Work IKEA* while sofas, coffee tables, stools as well as rugs & mats are presented in the section of *Living Rooms*.

The most unique experience in IKEA is that there is a predetermined traffic pattern. Customers can easily follow the the deliberately designed path and wander in the store without





Figure 4.26 Signage System for Minnesota Children's Museum, designed by Pentagram Design. (Source: Gail Diebler Finke, *You Are Here: Graphics that Direct, Explain & Entertain*, 1999, and Wayne Hunt, *Urban Graphics Entertainment*, 1997)



worrying about getting lost or confused. Two important elements help to achieve this: environmental design that helps to reinforce cognitive map, and information design that provides clear, consistent external clues. There is a main path on the second floor, the floor material of which is different than that of the rest of the area (Figure 4.27). The main path with

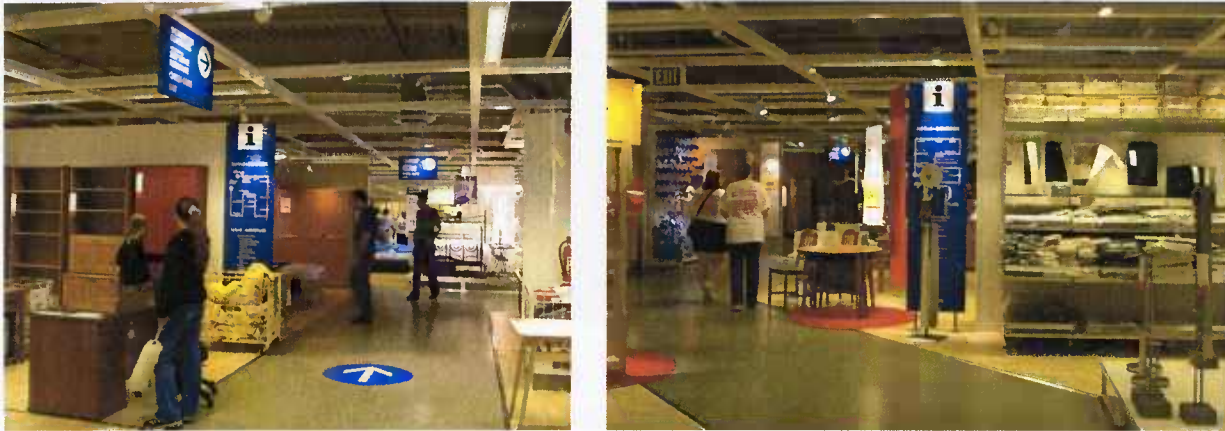


Figure 4.27 The main path with big arrow on it is covered with different floor material than the show areas. IKEA, Bloomington, MN. (Photograph by the author)

different floor material is consistent in width, like a highway. After customers wander inside the show areas, which are covered with wood floors, they can always step back onto the main path without even think about it. The difference is subtle yet noticeable. People can find their way without too much effort. Also, there are big arrows on the floor at some critical turning points to indicate which direction the customer should follow. Other than the main path, there are also several shortcuts that customers can follow if they want to skip some of the sections and go to the other ones faster (Figure 4.28). The paths that lead to the shortcuts are covered with the same floor material yet narrower in width than that of the main path, so that they are less noticeable. Reinforcement of the main path is very effective and the shortcuts offer alternatives for customers, especially for those who have limited time in the store or those who have a clear idea in mind what they want to see and what they do not.

Even if customers cannot notice the main path to find their way around, there is a consistent information design to facilitate wayfinding, which includes maps, information panels, identification signs and directional signs. Maps on the shopping guide, which is offered to the



Figure 4.28 Left: a narrower path leads to a shortcut. Right: a shortcut sign. IKEA, Bloomington, MN. (Photograph by the author)

customers at the entrance are as simple as if they are maps designed for a subway system (Figure 4.29). People will see a thick white line showing the one-direction path and several dots to indicate “stops” - different sections in the *Showroom* and the *Marketplace*. A simplified design like this is much easier for people to understand since not everyone can read architectural plans. Thinner lines with arrows were used to indicate location and direction of shortcuts and symbols were introduced for facilities and services inside the store.

When people are walking inside the store, they will see information panels on several locations with information such as a map showing you “you are here”, and list of items on the other floor. The map on these information panel is similar to that on the shopping guide except for two differences: there is a bright red dot with white text “you are here” on top to indicate which spot you are on the main path; each map on each location was turned to a certain angle, so that the arrow is always pointing at the direction that the customer is facing at instead of always pointing up to north (Figure 4.30). A map with a clear indication of where you are empowers people, make them feel like they have control over the shopping experience. Also, turning the map to the direction that customers are facing shows understanding of human behaviors and human needs.





Figure 4.29 Maps on the shopping guide, IKEA, Bloomington, MN.  
(Source: shopping guide from IKEA)



Figure 4.30 Maps on the information panel, IKEA, Bloomington, MN.  
(Photograph by the author)

Over each section, for example, *Bedrooms*, *Work IKEA*, *Kitchen & Dining*, *Lighting*, there is a big identification sign with the same blue background and white text. The sign is big enough for people to see from a distance. Directional signs are in smaller size for those who need extra information along the main path (Figure 4.31).

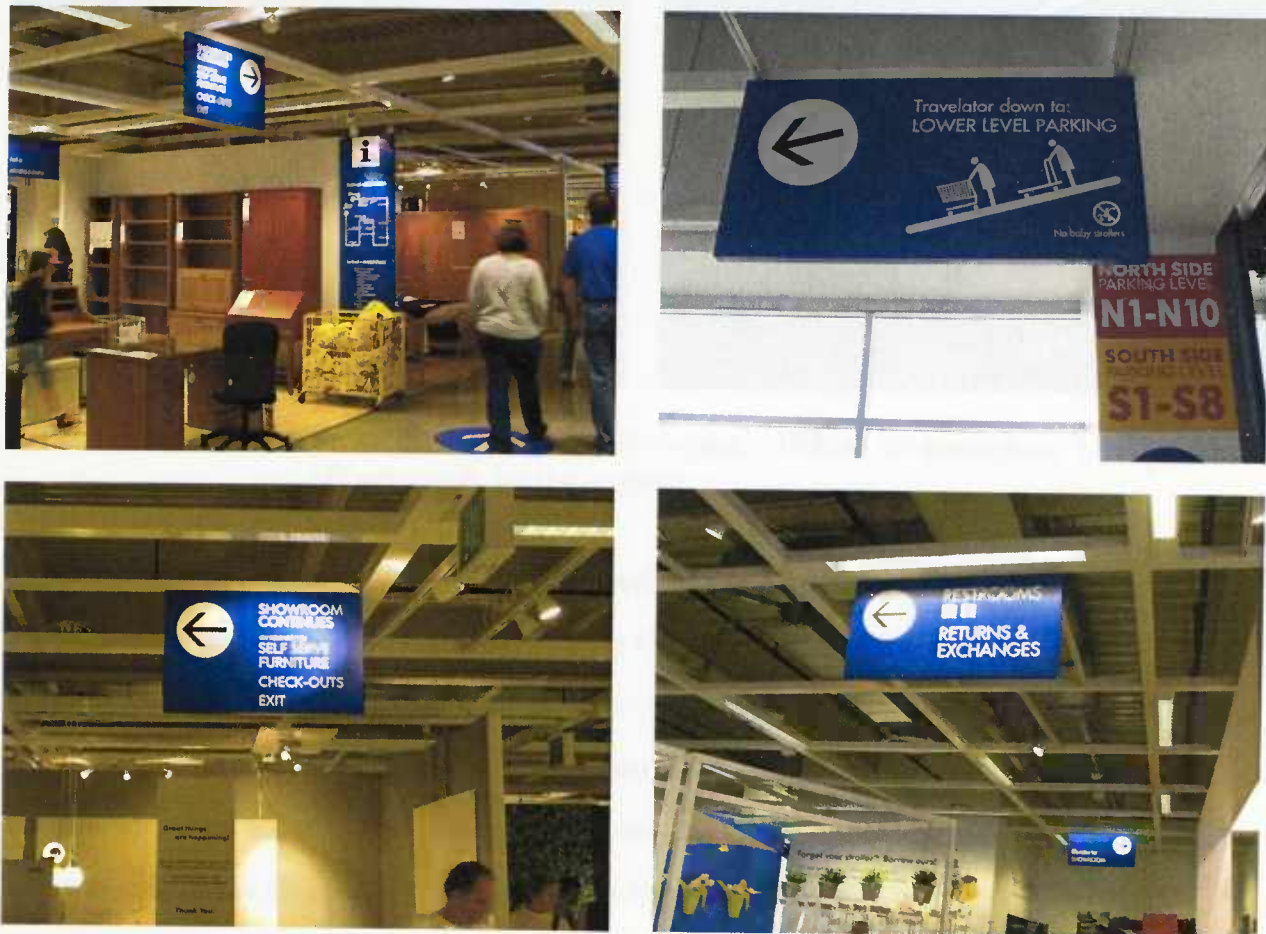


Figure 4.31 Sign system, IKEA, Bloomington, MN. (Photograph by the author)

Wayfinding solution of IKEA is not limited to environmental design and information design, but also services. For example, people can search for pre-visit information from their web site: driving directions, detail maps, and store information such as store hours. When people arrive, they can have a printed store guide with a well-designed map and index at the entrance. At the back of the store guide, there is a shopping list. Customers can put down product name, quality, aisle number and bin number, which can be found on every single furnishing in the store with a red tag. Signs of the aisle numbers are white text on red background, same as



that on the red tag. With the aisle number and bin number, customers can easily locate the furnishing in the section of *Self Serve Furniture* (Figure 4.32). Even if they cannot, there are always staff around ready to help.



Figure 4.32 Section of *Self Serve Furniture*. IKEA, Bloomington, MN.  
(Photograph by the author)

In all, wayfinding solution at IKEA offers means for different types of information retrieval needs: people can find their way by following the main path, the signages, or simply asking around. The easy-to-follow predetermined route is very helpful for first time customers or those who have plenty of time for wandering and discovering, while signages with detail information and the option of shortcuts are helpful for those with limited time for shopping or those who know exactly what they want to see and what they do not.

Wayfinding in IKEA is effective, and efficient. Information provided is consistent, easy to understand, accessible. Negative emotions such as frustration, anxiety, stress, fear and anger are avoided by the carefully designed wayfinding system. It helps people to relax, and find their way around with ease and confident. The simpleness and elegance of the signs are pleasurable to be looked at. But they are not enough to cultivate enjoyment since the wayfinding system does not help people to get more from the experience, for example, fun, surprise, or knowledge.

## CHAPTER 5. TAXONOMY OF POSITIVE WAYFINDING EXPERIENCES

In most cases, wayfinding is not purpose of the journey, but a means to reach other goals. For example, a mother shopping in a supermarket with her five-year-old boy do not go to the supermarket for wayfinding purpose. Wayfinding as well as many others elements (design of the environment, music or sound, smell, layout of the shelves, quality of the goods, service of the staff, design of the shopping carts etc.) all work together to create a positive or negative shopping experience. But in other places, such as a labyrinth, wayfinding is the majority that a visitor wants to experience. It is important for wayfinding designers to look at wayfinding at a broader view, to realize that wayfinding design is part of the user experience, sometimes a dominant part and sometimes a minor part. In order to create positive wayfinding experiences for different user needs, a study of taxonomy of wayfinding experience is a necessity. Different strategies are needed for creating different wayfinding experiences.

In his 1984 book, Passini claimed that “wayfinding is a fundamental key to environmental appreciation” and in order for the wayfinding experience to be “satisfying” the environment should be “perceptually interesting, complex and rich” [84]. In order to determine how complex the environment should be, Passini divided wayfinding experiences into three conditions:

- Emergency conditions, in which people should be able to reach a destination as fast and easily as possible.
- Resolute conditions, in which the functional aspects of wayfinding usually has priority, the experience of reaching a destination is also important.
- Recreational conditions, in which experience takes priority over the functional aspect of

wayfinding.

In the 1992 book, *Wayfinding: People, Signs, and Architecture*, Arthur and Passini divided wayfinding into two main categories:

- Day-to-day conditions
  - Travel conditions
  - Working conditions
  - Playing conditions
  - Retail conditions
- Emergency conditions

The day-to-day conditions includes normal (or “resolute”) conditions where “efficiency and utility” are the first priority, and recreational conditions where there is a “call for explore and enjoy a given setting” [29].

Another attempt in categorizing wayfinding experiences is created by Gary L. Allen. It is a three-category scheme based on functional goals [26]:

- Travel with the goal of reaching a familiar destination;
- Exploratory travel with the goal of returning to a familiar point of origin;
- Travel with the goal of reaching a novel destination.

The taxonomy of positive wayfinding experience created here is developed based on Passini’s model in 1984 and further developed into five categories:

- In emergency: it’s all about safety.
- Meeting deadline: efficiency as the first priority.
- Reaching destination: effective as the first priority.
- Wandering and exploration: pleasure and enjoyment as the first priority.

- Happily get lost: it's all about the experience.

Under different circumstances, strategies for wayfinding should be modified accordingly to better accommodate different wayfinding needs. A case study of wayfinding experience at IKEA, MN is analyzed to indicate how a wayfinding system works for different wayfinding needs. Other examples will be shown and analyzed to indicate how a wayfinding system affects people's emotion.

### 5.1 In Emergency

Under emergency conditions, such as a fire evacuation, the only thing that matters for people is to leave the dangerous site and go to safety as soon as possible. Failure to find an exit during an emergency condition can endanger people's life.

In his research about exit choice behavior in fires and building evacuation, Dr. Jonathan D. Sime and his colleagues argued that when there is a fire evacuation, staff left by the fire exit because they were familiar with it, while the public moved toward entrance and place affiliations if they were not guided by staff [90]. The conclusion from Sime was that "the direction of movement will depend and relate on four major things: the location of the fire, the location of the individual, the degree of familiarity and objects such as group of members and places of affiliations" [90]. In an emergency situation, such as in a fire evacuation, people are even more likely to be drawn towards the familiar than in normal circumstances, which means for visitors of the site, people tend to leave the building from the way they come in if the exit signs are not straightforward enough for them to follow. As concluded by Sime, "routes that are only to be used in emergency situations will only be used if it is exposed with a good sign or by staff's directions" [90]. When there is no guarantee that there will always be a staff nearby to lead people out to safety, design of the exit signs is crucial.

Another important finding from Sime is that under emergency conditions, people tended to behave in a controlled and rational way - as long as they had a hope of getting out and being saved [29]. Exit signs should be easily identified, separate from the rest of the signs since people will not have the luxury to look at the signs for minutes to find out which one is



the exit sign. Nothing can be too simple or too straightforward when people are lack of time and under intense stress. As Passini said: “Wayfinding under stressful conditions should not require the development of complicated decision plans” [85].

There are two kinds of exit signs in IKEA, MN, one of which is on directional signs along with other information (Figure 5.1, left and middle). The problem is: How can people quickly find the word *EXIT* from the other types when they are in panic? There is no different between the word *EXIT* and other words on the information panel. It is not easy to identify the word in a very short time for evacuation. The other kind of exit sign is designed with the white text *EXIT* on an illuminated background (Figure 5.1, right). They are located in several places in the store to help people find their way out in emergency. These signs look different than other signs in the store. But questions remain: Is the arrow too small for people under intense stress? And what if there is someone who does not know the language?



Figure 5.1 Directional Signs and Exit Signs, IKEA, Bloomington, MN.  
(Photograph by the author)

In Europe, there is a standard pictogram for emergency exit. Mijksenaar has worked for the wayfinding system for Amsterdam Schiphol Airport since 1990. “Research showed that users found emergency exit signs were too few and too small” [41]. Exit signs in the new wayfinding system appear every 30 meters, creating a very dense “green line” that is easy to follow to safety (Figure 5.2). Each exit sign contains one pictogram and one arrow, the height of which is the same as that of the pictogram. Exit signs are separated from the rest of the signs and consistent in composition and location (Figure 5.3). A highly effective and efficient wayfinding system for wayfinding in emergency designed like this can calm people down and help them behave in a controlled and rational way. They can easily find an exit sign, follow



Figure 5.3 Amsterdam Schiphol Terminal, application of emergency signs, designed by Bureau Mijksenaar. (Source: Leslie Gallery Dilworth, *Paul Mijksenaar: Wayfinding People*, SEGDesign, 2003)



the direction and go to safety.

People are under extreme stress when finding their way in emergency. Being disoriented in emergency can be fearful and fatal. A highly effective, efficient and straightforward enough wayfinding system is crucial. It helps to avoid negative emotions such as fear, so that people can calm down, and behave in a controlled and rational way, which helps them to go to safety. Wayfinding in emergency is not just a matter of convenience or comfort, but a matter of life and death.

## 5.2 Meeting Deadline

Most wayfinding activities do not take place under emergency conditions. Efficiency in reaching destinations is still important in some cases: catching a flight in the airport, going to an office for an important meeting, etc. Advances in our understanding of emotion and affect have implications for the science of design. Research has shown that “negative affect focuses cognition, enhancing depth-first processing and minimizing distractions. Therefore, it is essential that products designed for use under stress follow good human-centered design, for stress makes people less able to cope with difficulties and less flexible in their approach to problem solving” [78]. When there is an important deadline to meet, people are under stress during wayfinding. Their minds are highly concentrated, focusing mainly on related information. Extra information for something else will not be greatly appreciated. Similar to wayfinding under emergency conditions, wayfinding with a tight deadline to meet requires straightforward design with clear message. The difference is that people can comprehend more information than they can under emergency conditions.

Wayfinding system in IKEA, MN is effective and efficient. When people are shopping in IKEA with a tight schedule, they can always find information that is helpful for them to shop quickly. For example, a dad is trying to buy a toy for his son after work and go to the birthdays party in time. He can get a shopping guide at the entrance, look at the index, which is listed alphabetically, and find the word, *toy*. From here, he knows toys are displayed in the section of *Children's IKEA*. From the map, he finds the section of *Children's IKEA*, which is close to

the end of the main path on the second floor. With shortcuts and signs guiding directions, he can go there very quickly and get the gift in time for the birthday party.

Wayfinding in a complex site, however, needs more work to help people find their way quickly. *Bureau Mijksenaar*, an Amsterdam based design agency, was asked to design a wayfinding system for New York's JFK, LaGuardia and Newark International airports when a survey conducted by J. D. Power and Associates (the prestigious American marketing information firm) showed that 25 percent of customer satisfaction was related to wayfinding related issues, which included three categories of problems: getting to the gate on time, finding the restrooms, and leaving the airport [71]. Port Authority Director of Aviation William R. DeCota said: "Our customers have told us that better signs are among the most important ways that we can improve service" [2].

Although signs were claimed to be the most important ways in creating a new wayfinding system, Bureau Mijksenaar worked with more. First of all, clear, standardized terminologies were introduced in this comprehensive project. Secondly, international symbols were extensively used. Thirdly, color coding was introduced (Figure 5.4 and 5.5): yellow signs direct passengers to airline gates, ticketing and other flight services; green signs direct passengers to ground transportation services; and black signs lead to restrooms, telephones and other passenger amenities. Non-directional information, such as general announcements, carries a gray background. Also, wayfinding design of the three airports are consistent so that people using these airports can easily link to prior airport experience [71] (Figure 5.6).



Figure 5.4 Users' code key at the Port Authority of New York and New Jersey airports. (Source: Paul Mijksenaar, *Wayfinding for Transportation: Airports*, SEG D Teleconference, 2003)

The new wayfinding system (Figure 5.7) created by Bureau Mijksenaar was said to be "the

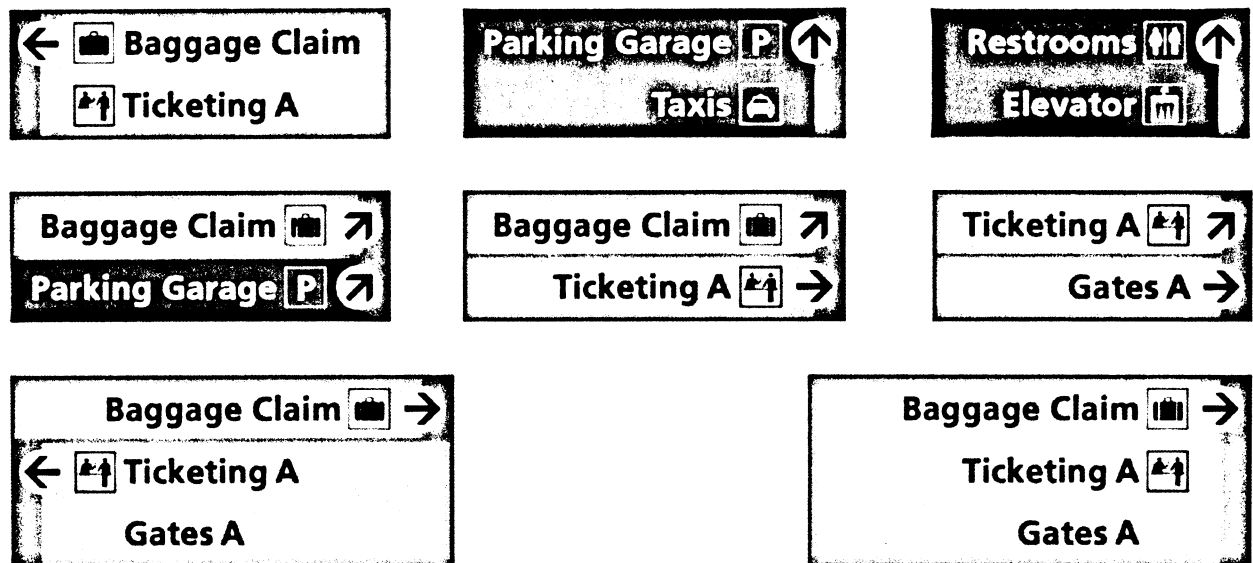


Figure 5.5 Clustering and supporting color-coding of information at the Port Authority of New York and New Jersey airports. (Source: Paul Mijksenaar, *Wayfinding for Transportation: Airports*, SEG D Teleconference, 2003)

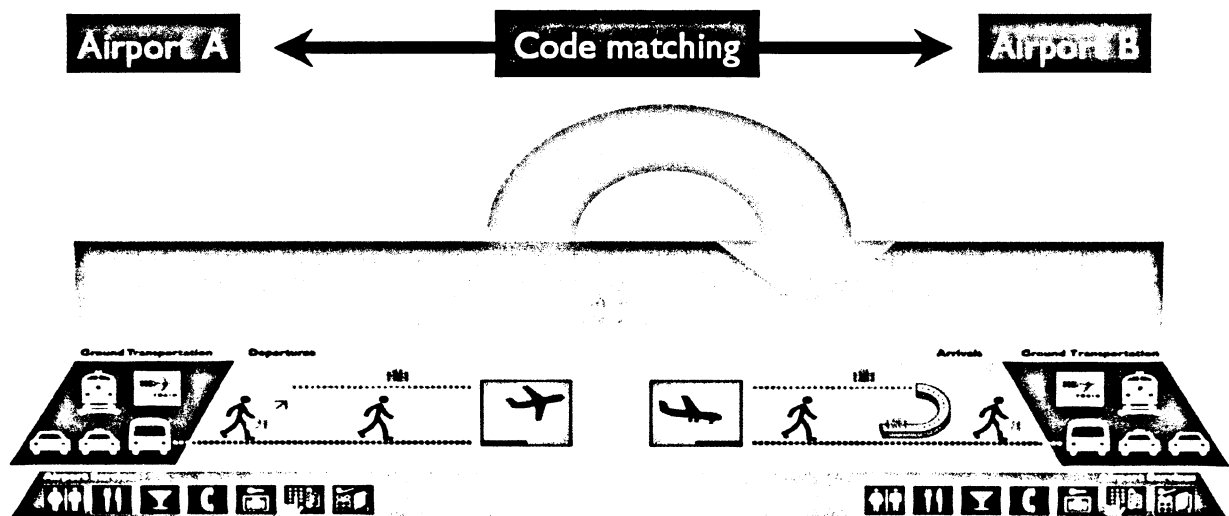


Figure 5.6 Code-matching to other national and international airports. (Source: Paul Mijksenaar, *Wayfinding for Transportation: Airports*, SEG D Teleconference, 2003)



best signage of the 21st century” [92]. J. D. Power and Associates conducted a new quality assurance test and found the new wayfinding systems “significantly improved consumer satisfaction” [70]. E. J. Mullins, the Manager of Airport Signing Programs for the Port Authority of New York and New Jersey likes to hear feedback from passengers on the new wayfinding system. “But he likes the feedback he doesn’t receive more” since “people found their way without even thinking about it” [70]. What makes the new wayfinding system in these three airports effective, efficient and user-friendly is its “consistency, clarity and conspicuousness” [4].



Figure 5.7 A comprehensive signage system designed for the Port Authority of New York and New Jersey. Signage at Terminal 4 JFK has been installed. (Source: Paul Mijksenaar, *Wayfinding for Transportation: Airports*, SEG D Teleconference, 2003)

Wayfinding with a deadline to meet is stressful for most people. The experience of getting lost, especially when there is a deadline to meet is very unpleasant and irritating. An efficient wayfinding solution helps to avoid negative emotions such as stress, anxiety and anger, so that people can find their way with ease, comfort and confident.

### 5.3 Reaching Destination

When missing a flight is very annoying, missing a bus or being late for a casual dinner with some friends might not be as big a problem as missing a flight. When wayfinding mainly for reaching destination, people do not travel for pleasure but for the necessity or compulsion.

However, wayfinding experiences like these are less stressful and people can be more relaxed during the process. Effectiveness is the first priority in wayfinding reaching destination, but without a tight schedule, extra information or other elements might be added to enrich the wayfinding experience as long as the wayfinding system guarantees effectiveness.

When people are shopping in IKEA, sometimes there are return customers only want to spend some time in a certain section, for example, the *Greenroom*. For these customers, they can choose to follow the shortcuts and reach the section of *Greenroom* without spending time walking through many others. The optional shortcuts and the clear signage help people to find their way to the destination easily and comfortably. But the wayfinding system in IKEA does not do much other than pointing directions to enrich the wayfinding experience.

Wayfinding in a library, most of the time, relates to reaching destinations. People want to go to a certain section and find the material they want. The image of a library often times relates to regularity and repetition. The wayfinding system for the Five Dock Library in Sydney, Australia not only helps people to reach their destinations, but also transforms the library into spaces of greater significance. As the BHA Design Team, architects of the library said, they wanted to create “a memorable, yet state of the art library facility for the new Five Dock Library” [11]. Colors are used for different sections of the library to facilitate wayfinding and the brightly sculptured walls make an exciting basis for the library. Wayfinding designers worked closely with architect Brewster Hjorth during the design process. Colors of the signs were chosen by architects to better work with the interior colors. Identification of the library’s various sections, open spaces, and rooms was achieved through the use of large numbers juxtaposed in various architectural elements: exposed ceiling, walls, glass windows, shelves [15]. Thus the wayfinding became integrated with the architecture “without being overbearing, invasive, and unsympathetic of the exposed nature of the library’s interior” [55]

With the colorful big numbers, people can easily find the destination. At the same time, signs for each section are different in colors, shapes, positions and relationships to the architecture elements. It functions not only as wayfinding devices, but also communicates the library’s visual identity. Negative emotions are avoided by the effective wayfinding system and positive





Figure 5.8 Five Dock Library. Architecture by Brewster Hjorth Architects, 2004. Wayfinding by Minale Bryce Design Strategy. (Source: Nora Richter Greer, *libraries for A New Century*, SEGDesign, 2005, and web page at <http://www.brewsterhjorth.com.au/p.asp?id=55&c=3>, Brewster Hjorth Architects)

emotions such as surprise and fun are cultivated during the wayfinding process.

## 5.4 Wandering and Exploration

Even though archaic and classical Greek culture always relate travel or wandering with suffering, “love of knowledge is the motive that drove Presocratics to travel extensively” [73]. With today’s advanced transportation and travelling facilities, travel and wandering have become more and more pleasurable and enjoyable. They become a means for entertainment, exploration or knowledge.

When moving from one place to another, people are not always in a hurry or simply trying to reach a destination. Sometimes they want to wander and explore between destinations, for example, girls in a shopping mall, a family spending a weekend in a park, students visiting a museum, etc.

Designers used to create labyrinth shopping centers in order to make people spend more time wandering around and potentially shop more. This idea “has been rejected by contemporary planners thanks to numerous complaints and negative assessments of commercial productivity” [85]. Even though people are relax, not rushing from one place to another, they want to find their way with ease and dignity. Wayfinding for people who have time to wander and explore still needs to be effective and efficient in order to be qualified as a positive wayfinding experience.

The wayfinding system in IKEA is very effective and efficient for people shopping in a hurry or in relax. When they have more time to spend, they do not have to look at the directional signs or maps for detail information. A predetermined route is carefully designed to help people finding their way with ease and dignity. The main route is consistent in width and covered with different floor materials. After wandering inside the show rooms, people can always step back on the main route and move to the next sections, the names of which are indicated by big overhead signs. The wayfinding system helps people to relax and focus on the shopping items instead of worrying about looking for signages to find their way. But the overhead signs showing the name of each section were not designed to cultivate pleasure or enjoyment. The

elegant design was mainly for functional purpose.

Centre Pompidou (Figure 5.9) in Paris is a complex site with several distinct departments: the Public Information Library (BPI), the National Museum of Modern Art (MNAM), the Centre of Industrial Creation (CCI), and places for other activities (children's studio, cinema, meetings/forums, audio-visual unit, publications and periodicals) [8]. It becomes a popular site with averagely 25, 000 visitors per day. A complementary study on the basis of interviews revealed that it was very difficult for most visitors just to say how many floors the building had and they were unable to name the parts that they had visited [57]. Centre Pompidou was accused of being friendly only to "ideal visitors" - generally young, Parisian, highly educated. For most first time visitors or those non regular visitors, it is rarely the case that they can stroll happily through the building with confidence. More often, "the outward appearance of freedom is likely give rise to aimless wandering which itself becomes transformed into anxiety" [57]. When people have difficulties finding their way around, they will blame themselves for not being able to navigate and not feel a sense of belonging to the place.



Figure 5.9 Architecture of Centre Pompidou, Paris, designed by Renzo Piano, Richard Rogers and Gianfranco Franchini. (Source: web page at <http://www.cnac-gp.fr>, Centre Pompidou, France)

In order to create a positive wayfinding experience in places that encourage wandering

and discovering, effective wayfinding system should induce positive emotions in people. When wayfinding problems were identified as a source for negative feedback, the Integral Ruedi Baur & Associates Agency was asked to develop a signage system in 1997. Baur did not look at the project as a purely problem-solving process. He understood that:

“in a place like this, the public does not want signage that is purely rational. Solutions that might prove appropriate in a train station or an airport no longer work in a space with a cultural function, and vice versa... One could even argue that, in such cases, the form makes an active contribution to the function” [33].

Baur worked closely with architect Renzo Piano, who designed the architecture, during the process. Piano’s vision of the information panels is that they would “give visitors an overall sense of the Centre’s activity [33]. Baur’s approach is to make visible not only the information needed for wayfinding, but also “the signage object as such” [33]. He used the colors from the building itself: red, blue, yellow, green. The major identification signs in Centre Pompidou are given three-dimensional forms by juxtaposition of types in the four colors, and backed up by a large neon arrow to indicate the direction (Figure 5.10). A secondary signage system presents ancillary information and capsule-shaped panels contain the pictograms (Figure 5.10).

Research shows that “aesthetically pleasing objects enable you to work better.” [80] A signage system with consideration of the context of the site and cultural implication can add to the experience of the site and at the same time, help people find their way with ease, pleasure and enjoyment (Figure 5.10).

“Positive affect tends to promote exploration and enjoyment of new ideas and possibilities, and new ways of looking at things - especially in enjoyable or safe situations” [59]. Wayfinding for places where people have time to wander and explore can be more than pointing directions. Pleasure and enjoyment during the wayfinding process should be the first priority in designing wayfinding for wandering and exploration. The wayfinding system can be used as a means to add to the experience of the site, to cultivate positive emotions such as pleasure and enjoyment.



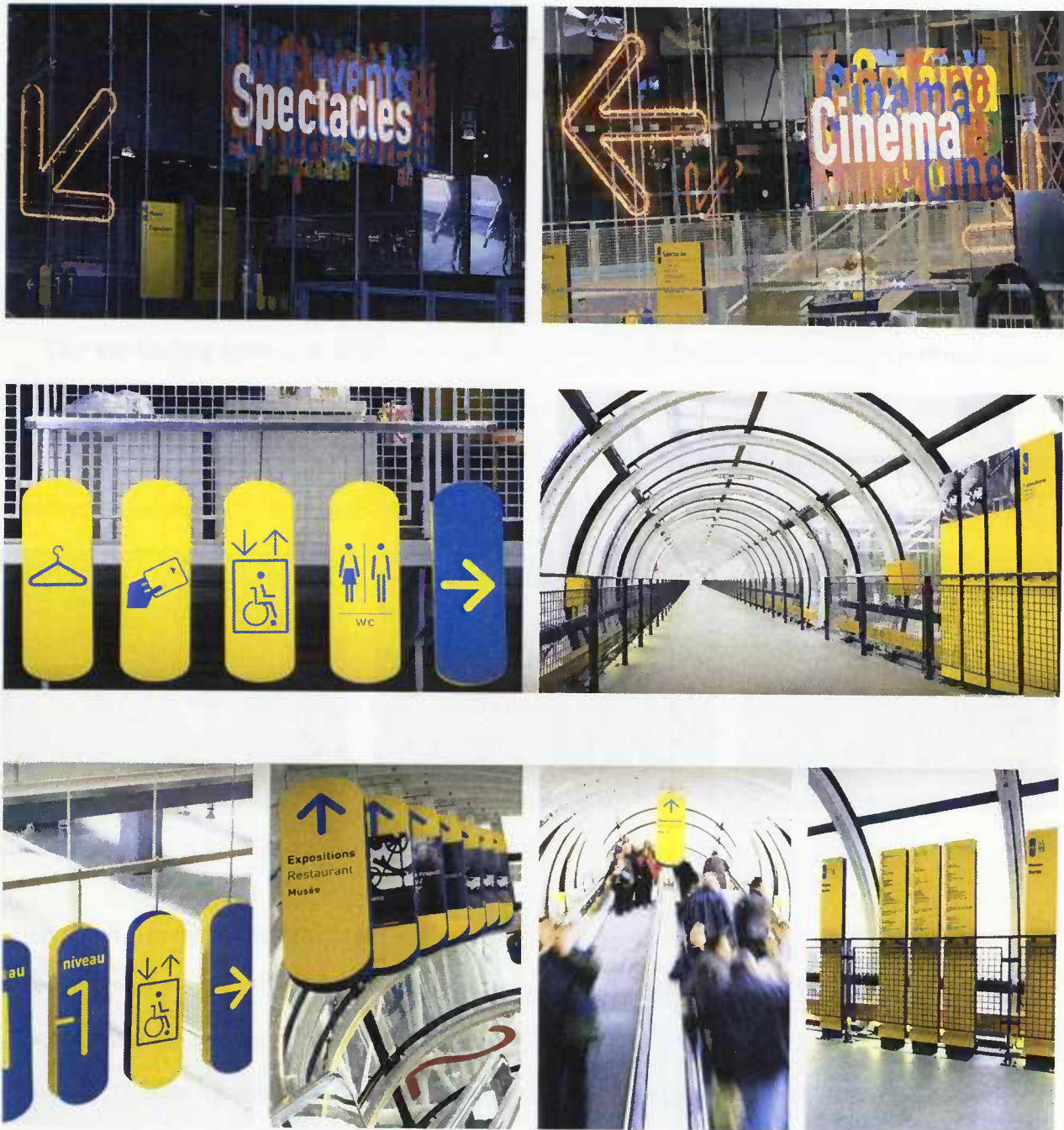


Figure 5.10 Signage system of Centre Pompidou, Paris. Designed by the Integral Ruedi Baur & Associates Agency, 1997-2001. (Source: Ruedi Baur, *Ruedi Baur..., Integral..., and Partners*, 2001)

## 5.5 Happily Get Lost

While wayfinding is usually about helping people find their way, there are a few exceptions. For example, a labyrinth is designed deliberately to disorient people. As Arthur said: “The power of labyrinth was physical - to disorient people and get them lost. It was also psychological - to induce a feeling of danger and fear” [29]. On the one hand, uniformity, repetition and twisted paths make labyrinth a place that evokes fear and danger. It can be used for security reasons as a defense system. On the other hand, labyrinth is place that evokes excitement, stimulation and curiosity. It can be used as a form of entertainment.

The wayfinding system in IKEA is very functional. Predetermined route, directional signs, identification signs, and maps work effectively to help people find their way. Some of the signages are extremely big in size and not easy to neglect (Figure 5.11). It is not designed for creating an experience that people can happily get lost.



Figure 5.11 Signs, IKEA, Bloomington, MN. (Photograph by the author)

A good example showing how designers deliberately disorient people and create an enjoyable experience is the Classical Chinese Garden. In ancient China, city planning has been characterized by regularity, predictability, and architectural control of human activities (Figure 5.12). The Chinese garden, on the other hand, provides a contrast to this sometimes stifling regularity. The gardens, especially those private scholar gardens in Suzhou, were built to provide a private, liberating experience for the individuals, who were always well educated men. *Liu Yuan* (Lingering Garden) is one of the four most famous gardens in China (Figure 5.13). Size of the *Liu Yuan* is not big. It is located in the city of Suzhou, China. But the paths and bridge are twisted, plants and walls are placed carefully to block viewers's eye

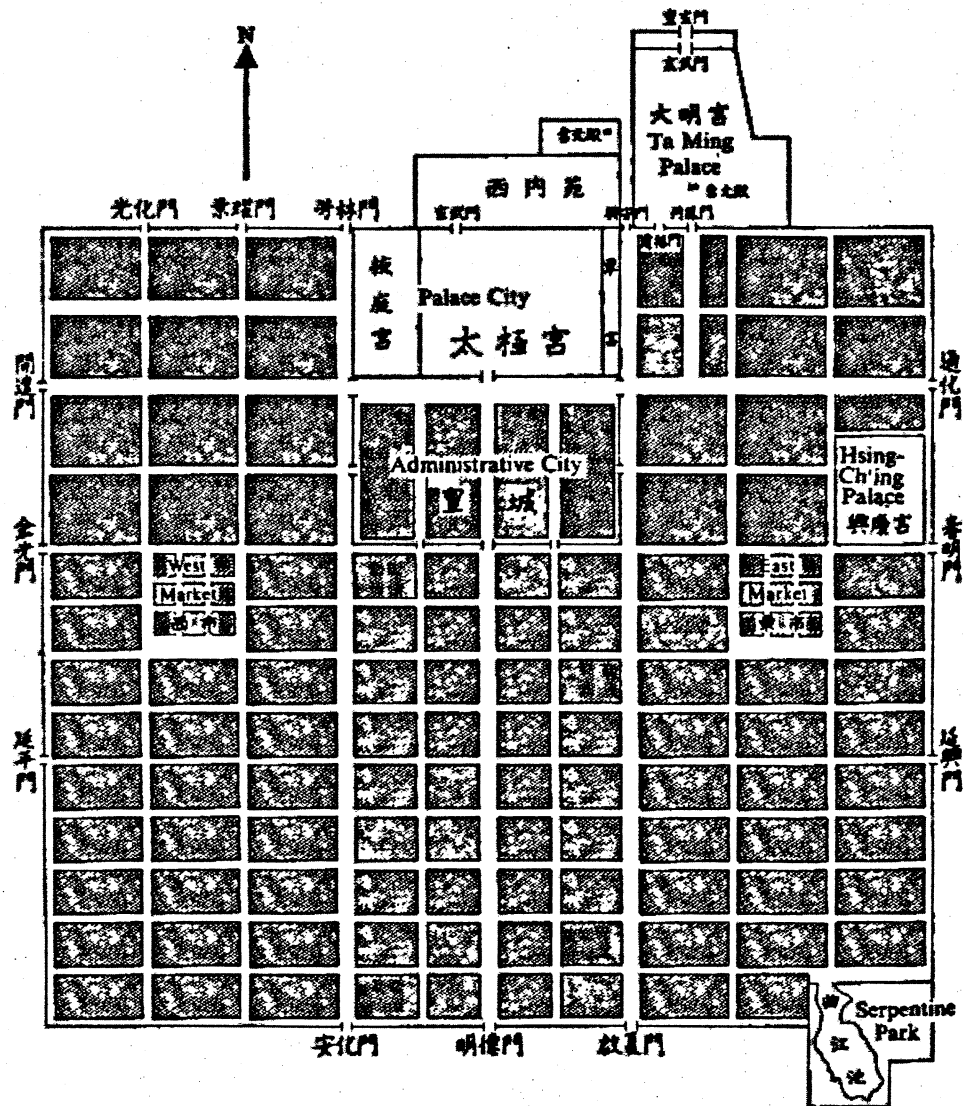


Figure 5.12 Map of the Tang capital of Chang-an (618 to 907 AD), when it contained upwards of a million people. (Source: Charles M. Nelson, *Urban Planning in Pre-Industrial China*, web page at <http://www.chaz.org/Pubs/CITY.HTM>)



so that it is hard to see the whole site of the garden. Few of the paths are straight inside the garden. When people are walking along the path, they will find themselves sometimes facing north, turn to south, then east, and sooner or later, most people will be disoriented. Being lost in *Liu Yuan* is such a pleasant experience since architectures, lake, bridges, rocks and plants are deliberately designed so that people can see very different sceneries when they walk along the paths. The goal of a successful Chinese Garden is that every time you turn around a corner, you see a different scene. Spatial complexity presents more than one could see at any one time, constant differentiation of elements revealed an ongoing variety of experience. It is a journey full of surprise and pleasure.



Figure 5.13 Liu Yuan (Lingering Garden), Suzhou, China, 1593. (Source: web page at <http://chineseculture.about.com/>, *About*)

In places that people want to happily get lost, experience is the most important thing to be considered. Positive emotions as well as negative emotions can be cultivated to enrich the experience. Just as people will experience fear as well as joyful when ridding a roller coaster, some people not only “welcome wayfinding challenges but at times even seek the sensation of being lost” [84].

Five different wayfinding experiences with different priorities were identified above. Each one of these does not exclude one another. In fact, in most of built environments, we need to incorporate several of the five wayfinding experiences to better accommodate different wayfinding needs. All built environments should solve problems for wayfinding in emergency. Airport is a place where some people want to go to the destination very fast to catch a flight, while others have to stay inside for hours to wait for the next flight. For these later group of people,

places inside the airport where they can wander and explore will be greatly appreciated. On the contrary, a park or a museum will be a place that people want to spend sometime wandering and discovering. But what if a mum suddenly gets a phone call from the daycare and she has to leave as soon as possible?

In the case study of wayfinding in IKEA, wayfinding in emergency is still questionable and the wayfinding system was not designed for the experience of happily get lost. The solution is effective and efficient for wayfinding meeting deadline, reaching destination. But the wayfinding system is mainly functional. It is not designed to cultivate pleasure and enjoyment. The elegant signages are pleasurable to be looked at, but they do not add more to the experience when people have time to wander and explore.

These five categories are helpful in a way that it helps to clarify different experiences that people might have under different circumstances. A positive wayfinding solution will focus on the dominant wayfinding experience that people might have in the built environment and incorporate other possible ones into a holistic solution.

## CHAPTER 6. CONCLUSION

In this thesis, evolutions of wayfinding study and experience design are reviewed. The status quo that wayfinding has been isolated from the discussion of experience design was questioned. It is suggested that wayfinding designers should be able to look at wayfinding at a broader view, to realize that wayfinding design is an integrated part of the user experience, sometimes a dominant part and sometimes a minor part.

Recently, the role of emotion, especially that of the positive ones and its potentials in experience design has gained increasing attention. As a part of experience design, positive emotion and its impact should be taken into account on wayfinding as well. A new people-centered approach, *positive wayfinding experience* is proposed to incorporate the extra dimension of emotion into a holistic wayfinding solution. A positive wayfinding experience is an approach that moves beyond problem-solving approaches to design. It is effective, efficient, as well as pleasurable and enjoyable. Key elements of a positive wayfinding experience includes the consideration of environment, information, service, and emotion. Under different circumstances, strategies of wayfinding should be changed accordingly based on different wayfinding needs.

Due to limitation of time, the hypothesis that positive emotion improves wayfinding behavior has not been tested. It is the author's goal to conduct testings in the near future to further explored this concept.

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